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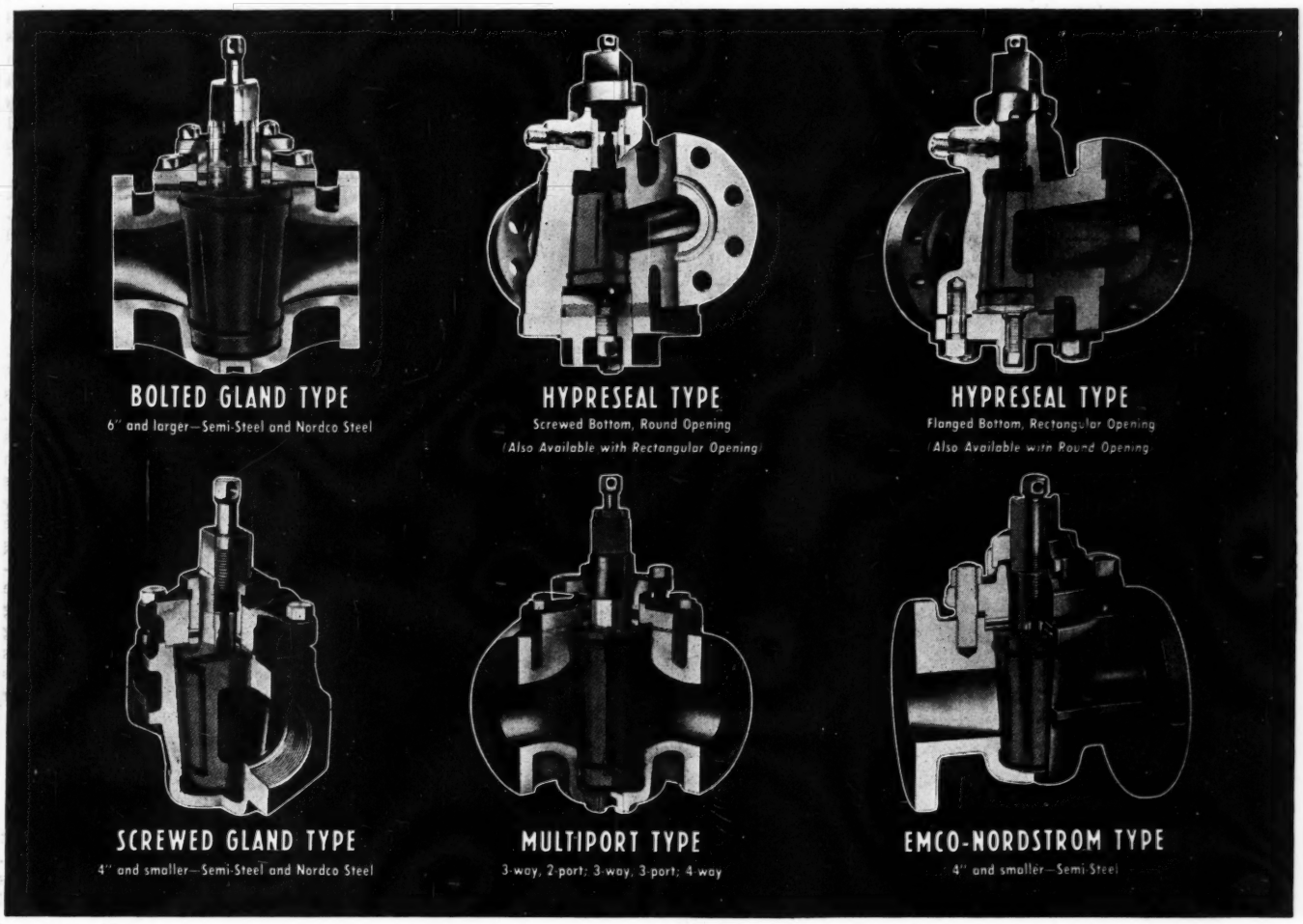

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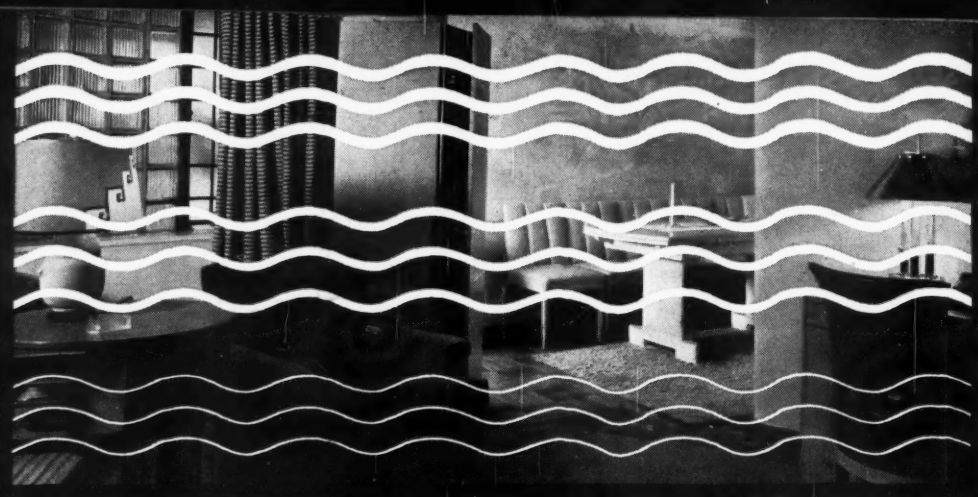

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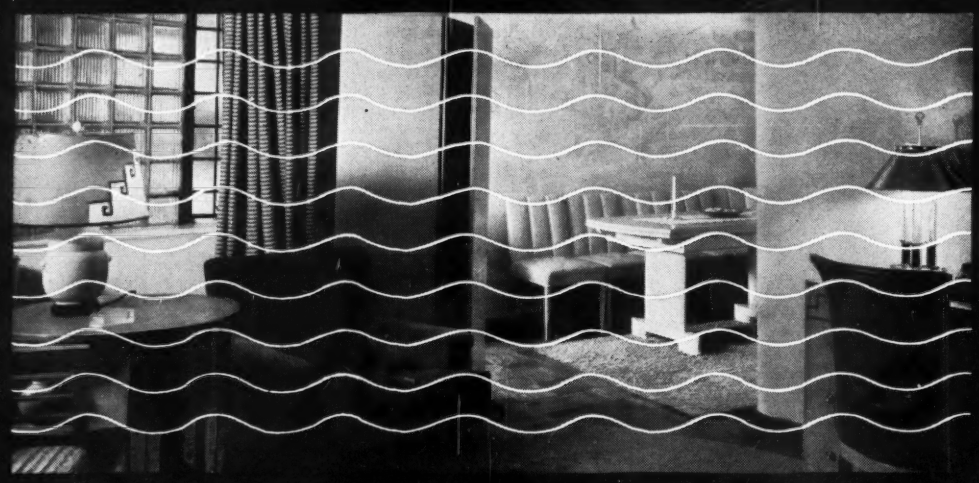

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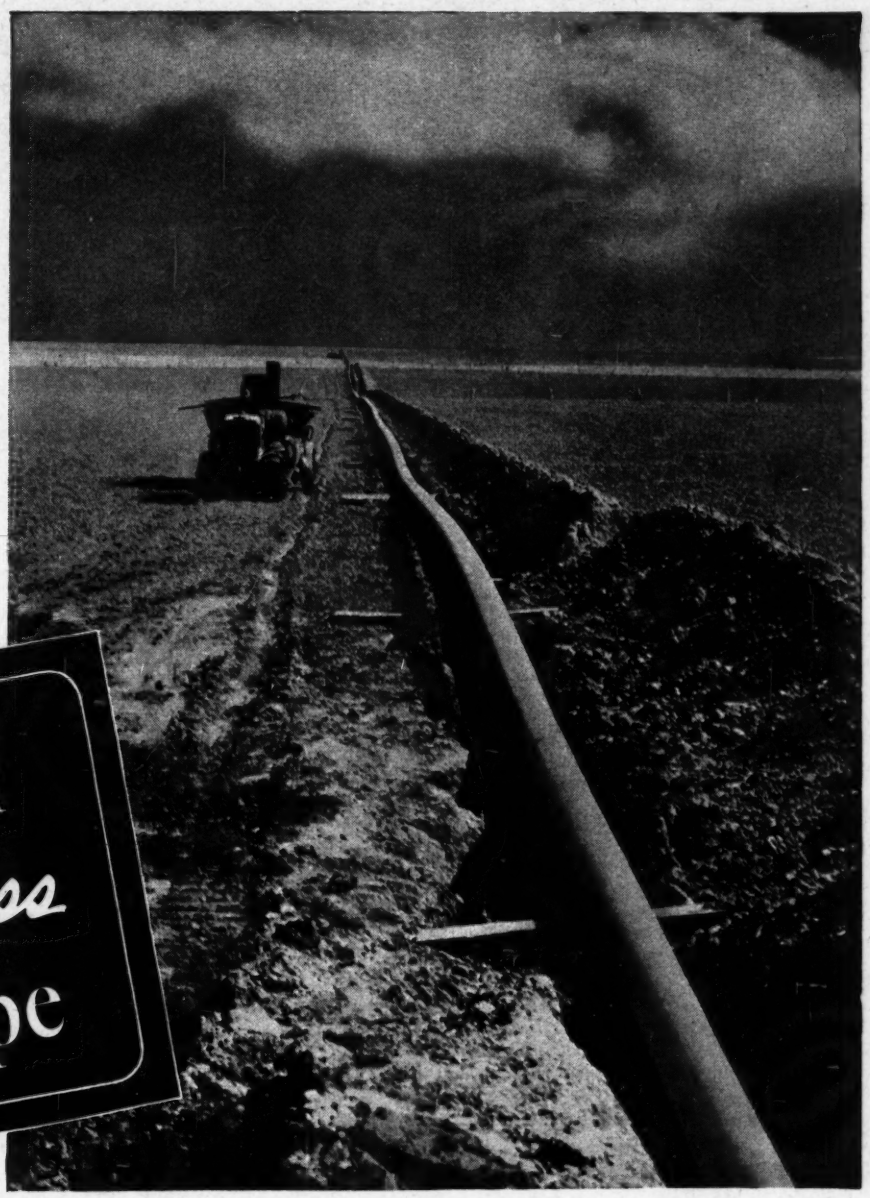

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GAS

REG. U. S. PATENT OFFICE

Twentieth Year of Publication

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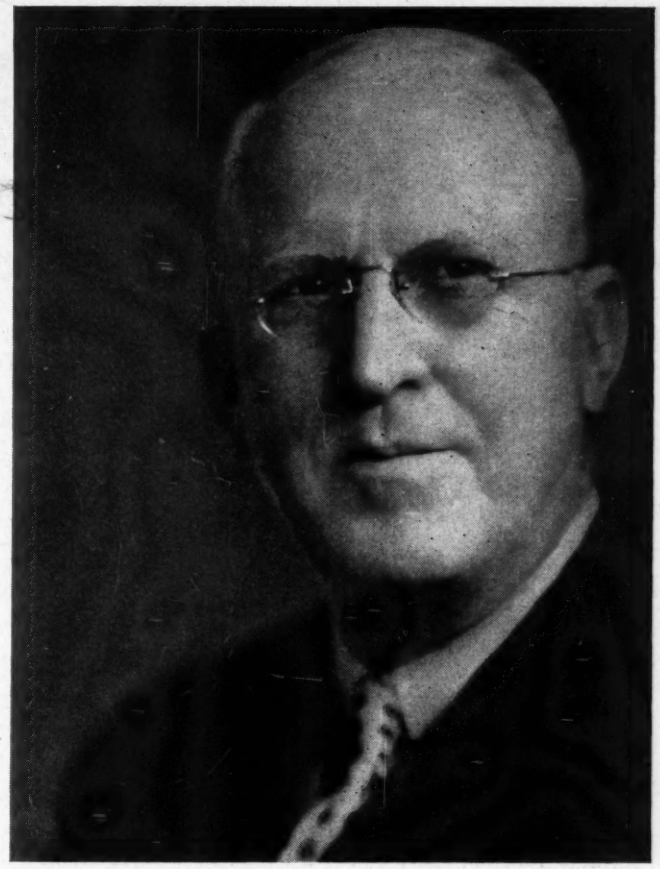
GUEST EDITORIAL

Conservation of Natural Gas For "Superior" Uses

By R. E. WERTZ

President, Amarillo Gas Company



IN a recent decision, the Federal Power Commission denied the application of Memphis Natural Gas Co. for a certificate of convenience and necessity to construct and operate additional facilities in Arkansas and Mississippi. One of the principal reasons stated for such denial was the following:

> "In view of the limited natural gas reserves shown by the record to be available to Applicant, their present rapid rate of depletion, and the effect of excessive rates of withdrawal on the ultimate recovery of gas therefrom, it is necessary and appropriate in the public interest that such natural gas resources be conserved in so far as possible *for domestic, commercial and superior industrial uses.*"

It becomes increasingly apparent that a new and untried factor is to be added to the orthodox utility formula for regulation of the natural gas industry. In addition to approved rates and other terms and conditions of service, the ultimate use to which the gas is to be applied must be of sufficient quality to pass a test of "superiority."

If the converse of conserving gas for a superior use is waste, then no one can find fault with the objective sought. There is nothing new or novel about regulation to prevent waste. Difficulties and uncertainties in applying any test of "superiority" arise, however, from two important sources—first, the varied and transient character of "superiority" itself, and second, the present diversification of the power to determine "superiority" and to conserve for that purpose. Space does not permit an attempt here to discuss either difficulty at length. The point is raised merely for the purpose of emphasizing that no objective, including this one, can be accomplished effectively unless its attendant ramifications are fully understood from one end to the other.

If we accept the principle that gas should be conserved for so-called superior uses, then, unless we are to save at the spigot and waste at the bung, we should also agree that the principle should be applied uniformly from the point of production to every other point where gas is to be consumed. Taking the Panhandle Field of Texas (probably the world's greatest gas field) as an example, let us see what has happened with respect to the ultimate utilization of its gas production.

Beginning with the discovery well in 1918, it is estimated that this field had produced more than 10 trillion cu. ft. of gas by the end of 1943. Of this tremendous volume, the available data indicate that 5% was blown into the air and used in drilling wells; 7% was casinghead gas blown to air and not treated; 30% was utilized in the field for the production of carbon black; 31% was consumed in the field by gasoline plants; and 27% was delivered to gas pipelines for domestic, commercial and industrial consumption. Current production figures show a higher percentage for pipeline withdrawals, but nevertheless more than one-half of total gas production in this field is still utilized for other than pipeline purposes.

If we examine the latest available data on natural gas production and consumption for the entire United States as shown in the Mineral Yearbook of the U. S. Bureau of Mines, we find a consistent pattern. Total national production for the year 1942 was approximately 4½ trillion cu. ft., of which less than 45% was delivered to pipelines for domestic, commercial and industrial consumption.

A substantial quantity of gas allocated above to the pipeline classification does not move in interstate commerce, but is transported and consumed within the states where it is produced. Thus it will be seen that in appraising the job of conserving natural gas for superior uses we are confronted in a large measure with a state problem, which does not lend itself to ready solution by the Federal Power Commission or any other national agency.

The objective of conserving natural gas for superior uses is worthy but not easy of accomplishment. Like religion, high crimes and misdemeanors may sometimes be perpetrated in its name. The old law of supply and demand has therefore exercised a forceful effect upon the conservation of any commodity for superior uses. It is possible that in the not too distant future producers of gas will be very reluctant to produce and sell gas for any fuel purpose, preferring to hold, produce and sell at higher prices for newly discovered chemical processes or other purposes.

Any successful program to conserve gas for superior uses will require a high degree of cooperation, not only on the part of national and state regulatory bodies but by producers, pipeliners and consumers as well. Otherwise, the intended service in the public interest may well turn out to be a distinct disservice. Above all, a constructive solution of the problem will require a thorough understanding of its magnitude before undertaking any program. The hope of provoking thought along these lines has prompted the above observations.

Research

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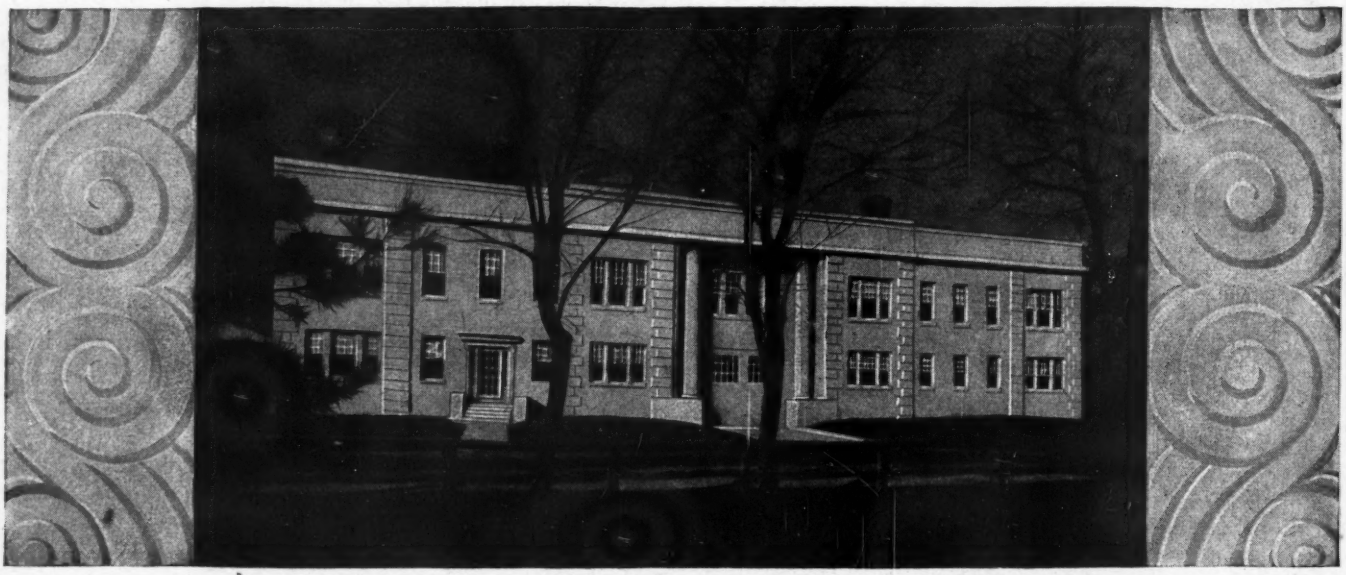
AMERICAN HEATING EQUIPMENT

Research has been a major factor in the development and refinement of AMERICAN Gas-Fired Heating Equipment. It has resulted in improved comfort and convenience with gas heating, and has brought leadership to our products.

Engineers are continuing this research so that when materials and labor are again available, product development in the post-war era will proceed without delay.

In the meantime we are furnishing AMERICAN Gas-Fired Heating Equipment for essential replacement, subject to prior commitments, curtailed production and war needs. We invite inquiries as to the status of any product.



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AMERICAN RADIATOR & Standard Sanitary

New York CORPORATION Pittsburgh

Thermally Thinking

By ELLIOTT TAYLOR, Washington Editor

Timely

WASHINGTON Gas Light Co. scooped the nation's capitol on invasion day window displays, when all eight of the windows in the new building at 11th and H streets were decorated with posters headlined, "This is it— the invasion is on—" before the early risers who walk past the building were through with their coffee and donuts. The balance of the text was bond selling copy in support of the 5th war loan campaign. We asked acting advertising manager R. H. Lewis if he had a direct wire to the supreme command, but he explained the timeliness of the display in much simpler terms. Said everybody knew the invasion was coming soon, so he just bought the posters and laid them on the ice till the big event was announced.

Warning Notes

"ELECTRICAL WORLD" which must be recognized as some sort of an authority on the electrical industry, since it is supported by more industry advertising per single issue than all of the gas magazines put together carry in a whole month, gives the horselaugh to the AGA postwar planning committee's Recommendation No. 9, which ushers in a new era of cooperation between the gas and electric industries by giving the lighting and ventilating load to electricity without a struggle the while reserving cooking, water heating and refrigeration to gas. Says "Electrical World":

> "Unfortunately the gas industry's formula for dividing the business is very much like that well known formula for rabbit stew—one horse, one rabbit. . . The electrical industry is not going to be content to serve in the kitchen only the load that gas cannot serve. If it is to achieve the goal of double-the-residential-usage or any other substantial increase it must greatly increase the use of electric cooking and water heating."

Since there wasn't much justification for this recommendation in the first place, the committee is no doubt prepared to see it taken lightly; but it is interesting to note in the same editorial in "Electrical World," that the editor does not dismiss the whole activity of the postwar planning committee with light words.

Asking his own industry how its plans are faring he says: "In the meantime the electric utilities might ask themselves how much further along the line of complete electric service in the home they might be five years from now if they had a unified program similar to that of the gas industry."

Pondering this warning, and recalling the many solemn admonitions that we too have issued in past, we can come to no other conclusion than that editors in general delight in trying to scare hell out of their readers.

Official Example

WE have been struggling prayerfully with our conscience over the question of obeying the call of duty as pointed out by the Office of Defense Transportation, and editorializing briskly against any further conventions in the gas industry during the war. We are pleased to be able to report now that our mind is at ease, and we have decided to make no recommendations on the subject one way or another. In days gone by we went on record as favoring a limitation in the number of annual meetings held in the industry and while we got a few encouraging letters from stove and meter manufacturers whose livers and kidneys are not up to the strain of two or three days and nights of uninterrupted "friendship," we must confess we heard of no convocations cancelled and we got some pretty dirty looks from association secretaries.

What we were unable to accomplish we nevertheless thought would not prove an impossible task for the Office of Defense Transportation. But it finally turned out in the gas industry, and we suppose in most other industries, that the conventions were renamed business meetings, evening entertainment was omitted for some unfathomable reason, and attendance records showed turnouts bigger and better than ever.

There is nothing reprehensible about this as far as we can see. The example was set by official Washington. No underling in any war agency was so unimportant that he couldn't dream up some kind of an excuse to go somewhere at government expense, and most of them did and do go. While preaching against conventions on one hand, the WPB and the PWA and the OPA and other offices jumped at the chance to shove speakers on the platforms of meetings that shouldn't have been held to read out loud the mimeographed orders that had already been mailed out to the delegates who weren't supposed to be present.

As we write the Republican national political convention is on in Chicago and that edifying spectacle will be followed by its Democratic duplicate, a few weeks later.

We are confident that neither of these great bodies would be guilty of any act of precept or example that would be inimical to an early victory, and we humbly commend the gas industry to their patriotic example.

FPC Appointments

THE opposition that has bobbed up attempting to block Leland Olds from reappointment to chairmanship of the Federal Power Commission since his term expired June 23 may or may not be able to prevent his confirmation by the senate. Since the issue will probably have been decided one way or the other before our comments on the matter appear in print there is little point in attempting to anticipate what the senate action will be.

However, this thought does come to mind, that with one commissioner's term expiring every year it seems that there never has been any serious attempt to place the name of a competent practicing natural gas man before the president with recommendations for his appointment to the commission.

Of the five commissioners not one brings to the consideration of natural gas problems any background information more extensive than that which he has been able to glean while sitting with the commission.

Ex-chairman Olds is an experienced labor economist and something of an expert on electrical power. He was appointed to the FPC as a new deal payoff to the Ameri-

can Labor Party of New York State, in which he was active. He knows nothing about natural gas.

Vice chairman Basil Manley is an old politician and Washington lobbyist who represented the Power Authority of the State of New York prior to his appointment to FPC in 1933. His practical insight into natural gas matter is nil.

John Scott, an Indiana lawyer, who has devoted most of his active career to the leftist aspects of utility regulation; Claude Draper, a Wyoming Republican politician until appointed to FPC in 1930; and Nelson Smith, newest appointee, who came to Washington from the New Hampshire Public Service Commission make up the rest of the commission.

Not only is there not a single natural gas man on the panel, there isn't even one who comes from what could be considered a natural gas area. We believe that an informal canvassing of industry opinion would net the names of several competent natural gas experts whose names might be submitted through the approved political channels with the suggestion that one be considered for appointment to the next FPC vacancy, which will occur in 1945.

The commission is taking a new and more comprehensive view of its responsibilities under the Natural Gas Act, and with the possible exception of whatever individual might be replaced, its members would welcome at least one voice that could speak with conviction and authority on natural gas matters.

Trends

WE don't put too much store by the quantitative accuracy of the consumers requirements survey tabulations recently released by the Office of Civilian Requirements of the WPB. And with the editorializing that accompanies the release—such as "The survey results indicate that the American public will follow a sensible buying policy instead of creating a sudden boom market . . ." we have little patience. Since most of the families reporting that they would buy one or more appliances immediately if they were available would buy out of current income, the "sensible buying policy" adopted after the war, when current income drops might be not to buy anything until the breadwinner had landed a new and reasonably secure job. On the other hand, if the government permits or encourages gradual inflation as the easiest way to get out from under the anticipated $300 billion national debt, savings will be dumped on the market in a hurry to acquire any kind of physical property in preference to money or government obligations held as savings. Consequently, what the public interviewed now thinks about how fast or how slowly it will spend after the war doesn't, in our estimate, amount to much more than a couple of hills of beans.

But when it comes to a statement of preference of what they would like to buy, that is another matter and well worth looking into. The biggest demand is for washing machines, with 4,261,560 wanted; 3,827,048 want mechanical refrigerators, and 3,166,924 want new cooking stoves. Of this demand for new cooking stoves, 1,328,604 is for gas; 493,004 for electric; and the balance want coal, wood, or oil stoves. Thus the combined total demand for gas and electric ranges is 1,821,608, of which approximately 70% is for a gas range and 30% for an electric model. While this shows a goodly margin of preference for gas over electricity, it is well to note that for 1941, the last year of comparatively normal production, gas ranges ran 77% and electric only 23% of the total sold. The survey may not mean much, but still there is no satisfaction to the industry in viewing what appears on the surface to be a slow decline in the popularity of its product.

The booming interest in electric water heating is even more pronounced—pronounced enough in fact to look a little bit suspicious to us from where we sit. For a total estimated U. S. demand for gas and electric water heaters of 593,276—persons who would buy if they were available, 334,240 or 56% want gas water heaters and 259,036 which is 44% expressed a preference for electric. The 1940 figures for gas versus electric water heater sales were about 81% gas and 19% electric.

Since most of the respondents to these investigations are indulging in a little day dreaming and wishful thinking, and since the appliances aren't available to enable either the gas or electric industry to check the accuracy of their avowed intentions, we do not believe the figures released need be regarded as indicating a state of potential public acceptance that cannot be remedied. But we believe that they do point up, as so many other signs of the times have also borne out, the necessity of gas promotion going into high gear before, and not after, the merchandise is all ready for delivery to the customers.

IN THIS ISSUE

It is our purpose here to administer a few pills, sugar-coated and swallowable, in the hope that our busy readers may be stimulated to turn a few pages, perhaps read a few paragraphs that may prove interesting, inspiring, helpful.

● What is a "superior" use for natural gas? R. E. Wertz, our Guest Editor, discusses on Page 7 the importance of the answer to this question both to the natural gas industry and the consuming public.

● Accent on sales. Hudson Reed, president of the Philadelphia company sets down four basic sales principles upon which every company can base a plan of postwar action. (Page 13). Those interested in appliance design may find the British viewpoint on this subject of interest. (Page 15). Roy Wright on Page 17 thinks there is too much complacency over our entrenched position in the commercial field. Thinks we might well spend a little money to protect that load.

● G. A. Saas is an energetic young man who handles public relations and a number of other responsibilities for the Citizens Gas and Coke Utility, Indianapolis.. That company's Free Appliance Repair Plan has been his particular baby, and he has outlined in detail (Page 19) the results of one year's experience—general aspects of the plan, effect of advertising on service requests, costs, and customer response.

● E. S. Bryant and Frank Knoy of Long Beach, Calif., are not new-comers to the pages of GAS. Their work on enrichment with LP-gases to meet peak conditions has attracted nationwide attention. In this issue (Page 24) they discuss methods for determining daily and monthly demands for various weather conditions.

● E. G. Dahlgren has just been named acting secretary of the Interstate Oil Compact Commission. He is thus especially interested in underground storage, and this month (Page 29) presents the first part of his review of such facilities in the United States. A general discussion on this topic by French Robinson appeared in June, Page 29.

● There has been much talk of air conditioning, and so we asked Servel for a factual article. They obliged with the contribution on page 40. This article, illustrated with diagrams, takes up the heating and refrigeration cycles, air circuit, and control. Performance data on an installation in New Jersey are discussed as are service and service costs.

● We wouldn't want to neglect the ladies, so we ask you to turn to Page 45 where Luella Osborn tells of her experiences in helping the youngsters of today cook dinner for the family while Papa and Mama are war working.

Maintaining Sales Initiative Post-War

By HUDSON W. REED

President, The Philadelphia Gas Works Company

NOTHING that I state must be construed as pessimism regarding the future of the gas industry. To the contrary, I am emphatically optimistic. I make this statement with the full realization that our gas sales during the past two years should not be considered normal and viewed with complacency, and that the present volume of domestic sales, inflated by supplementary heating due to the shortage of coal and oil, can be maintained only by pre-war sales promotion, multiplied many times.

Why am I so optimistic of the future of gas? I have but one answer—450,000 women in Philadelphia can't be wrong. You may be able to fool a few women on household appliances but not 450,000 of them. There must be something worthwhile in the gas range to satisfy this number of women in our city alone. Their judgment is worthy of our full confidence in the future of the gas business.

It is to be regretted that the gas appliances available will be far short of normal demand for several years. This shortage will create a tremendous back log for appliances after peacetime conversion of industry. This is a terrific break for our competitors. Prospective customers will be so hungry for new and additional appliances that some of them will buy whatever is available. It, therefore, behooves the manufacturers of gas appliances to be in a position to deliver their product promptly. The gas companies must see that they are sold and installed as fast as they are delivered.

Four Sales Principles

There is no common sales formula that can be successfully applied in detail by all gas companies. There are, however, certain basic principles that cannot be disregarded. The Philadelphia Gas Works Co. has given serious consideration to its postwar sales problems. We have arrived at a few basic conclusions that we believe should be incorporated in every sales plan. These conclusions, stripped as they are of all non-essentials, will be the foundation of our postwar sales

FIRST: A practical sales plan for reaching all new prospects, as well as present consumers, embracing office and street sales, and dealer cooperation.

Keep in mind that appliances are sold for the revenue they bring in through their daily use of gas, not for the merchandise profit derived from their sale. A gas utility that develops sales policies and practices that make it possible for distributors and dealers to profitably sell high quality gas appliances in its territory has multiplied its customer contacts many fold. The gas utility alone cannot hope to supply the appliance demand that will exist postwar. The failure to set up a successful dealer organization will throw the larger portion of this business to a competitor.

However, nothing should detract from an aggressive merchandising activity on the part of the utility. One of the important reasons for the utility being in the merchandise business is its ability to set a high standard in appliances through customer sales contacts, floor displays and advertising, thus stressing the type of appliance desired on its lines. Through such promotion, public desire is created and dealers readily fall in line.

SECOND: An advertising plan designed to tell your customers the simple truth concerning the satisfaction and convenience obtained through their use of gas appliances.

Such advertising should be promotional in nature and should stress the benefits that the customer will gain through the use of modern postwar gas appliances. Do this and give your prospects what they need to guide them. Above all, keep advertising on a high plane—clean and ethical, but devoted entirely to the promotion of the use of gas. Such an advertising program will pay more dividends in the form of sales than meaningless and inane visions and slogans. Advertise for the purpose of promoting gas appliance sales—connected appliances pay dividends—slogans use no gas.

Do not be depressed by the tremendous amount of publicity put out by the manufacturers of competitive appliances. There will be some changes and improvements in the construction of postwar appliances and new homes, but the dream home, loaded down with the visionary appliances, that has been so widely publicized is for the far distant future. Even though it were possible to incorporate all of the features advertised, it would place a cost on such homes that few could afford to buy them. To incorporate all of the visionary improvements in new homes, which many authorities say must be sold at moderate prices, simply does not make sense. Keep in mind that the millions of homes now standing will still be occupied and kitchen activities will be centered around the present types of gas appliances for many years. The prin-

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"FOR THE STRAIGHT gas companies that are on their toes planning now for their future, I predict success. It is to the representatives of these companies my remarks are directed to in general, and, in particular, to the sales departments who must carry the postwar burden. It will be the sales departments of the straight gas companies who must carry the responsibility of maintaining the present volume of domestic sales. To do this, they will require the full assistance of every employee in their companies. Keep in mind that any losses in gas sales are net losses because there is no electric division to absorb them. You cannot liquidate your investment in production and distribution facilities. To carry on, you must use them to their full capacity. Cold generators and poorly loaded mains are liabilities, not assets. With this idea firmly fixed in our minds, I can state frankly that our company plans to make every man and woman employee a promoter of gas and gas appliances, so that these facilities may be operated to full capacity during the postwar period." Mr. Reed's address was presented before the Annual Meeting of the Pennsylvania Gas Association at the Benjamin Franklin Hotel, Philadelphia, Pa., May 2, 1944. Excerpts are published herewith.

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cipal market for many years will be the homes now occupied. By all means, secure a fair share of the business in new homes, but retain your advtantage in the present ones.

It may be difficult to keep your feet on the ground and your head out of the clouds when you read of the remarkable predictions made for changes in our home life, as the result of wartime inventions, and through the applications of electronics, etc., but again I say, our present home life will not be revolutionized by any present known devices. Use vision in your advertising. Don't be visionary and impractical, because if you do, you will be unable to make good on what you have led your customers to expect.

THIRD: The sale and promotion of modern, efficient and practical appliances is the definite obligation of the gas utility.

In the postwar period, gas appliances of every conceivable type and quality will be availabe. The utility must decide which type it will promote and encourage gas appliance dealers to sell. It is not sufficient for the utility to say that it will sell and promote the "best" appliances. Such a policy is indefinite. It may be that for a particular market, the best appliances are not the most expensive or the most deluxe that the industry can produce.

Take for example, Philadelphia—our territory is circumscribed. We do not have available the suburban area that includes a large section of population to whom can be sold the higher priced appliances. As a result, we have in Philadelphia an average market, and it is necessary that we sell and promote "average" appliances. By "average," I mean an appliance that is sold at a reasonable price but which has features and performance, that, for example, in the case of the range, will give the maximum service that gas can offer as a fuel. This would mean a CP range with automatic ignition, but without all the deluxe and costly extras that are generally associated with this range. Do not pin your hopes on one CP range which only the well-to-do can buy. Promote complete lines of CP appliances that meet every pocketbook. Remember that performance, not price, is the true test of any appliance.

A good appliance will stay sold—conversely, a poor appliance will cost the sale of many others that otherwise would normally come to you. Keep in mind that while a satisfied customer may not shout out his appreciation, a dissatisfied one will tell everyone he meets.

FOURTH: Prompt and courteous service MUST be rendered our customers whenever their appliances require it.

Keep in mind that all mechanical devices will, at times, require service. All reasonable people understand this to some extent. They will more fully understand it, and will profit by expert advice and guidance if the trouble is explained to them. Well-trained home service girls and expert customer service men are your greatest asset in keeping with the customer. I cannot emphasize strongly enough the importance of training them to be courteous and efficient. Courteous and efficient service can create much good will, and it is the good will of your customers that you must develop and hold. This should be constantly impressed upon your employees. Again I repeat—every employee, particularly those who contact your customers, should be sales-minded.

These principles are fundamental and all embracing. They do not involve appeasement or cooperation with our competitors. I have no sympathy with postwar plans, supposed to represent the best thinking of the gas industry, which recommend an appeasement policy toward our competitors. Some of these plans even go so far as to suggest that the gas industry should advertise and recommend electric auxiliary equipment. Such a practice would provide the opening wedge for competitive appliances. The excuse for such appeasement is stated to be to avoid a knock-down and drag-out fight. Since when has a straight gas company known any other type of competition. We in Philadelphia well know the meaning of strong competition, both from the Electric Utility and the Electrical Association. However, this competition though severe has been on a high plane and I am quite sure that both the public and the utilities have benefited by it.

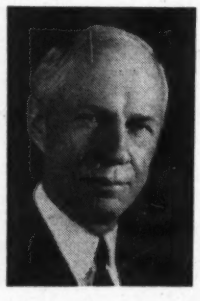
I have not heard any straight electric men suggest that the cooking and water heating belongs to gas and that they will so recommend. No, cooperation is to be given by the gas industry only. When the millennium has arrived, then we will talk of reciprocal agreements.

Appeasement is for combination, not straight gas companies. Any straight gas man who depends upon appeasement to or cooperation with his competitor is merely riding for a fall. There is but a slight chance that such a bargain could be made with an electric operating company without challenge from some governmental agency. The manufacturers of electric appliances, however, would never be bound to such an agreement. For the postwar period, I advise all straight gas companies to stick to their own knitting by promoting gas appliances only. Avoid any entangling alliances; they are but pitfalls to take your mind off your business at hand.

National Promotion Needed

Do not rely too much upon the sales help that our national organization can give to each company member. Unfortunately, it has all of the problems of the industry to worry about, and little or no time has been given to the problem of sales promotion. As a result, the field of sales promotion has been practically untouched from an industry standpoint. Committees can help somewhat, but their membership consists of utility representatives from widely separated localities with widely divergent viewpoints. The members have a full time job to perform at home and a relatively small amount of time available for committee activity.

I believe it highly incumbent upon our industry to finally assume the responsibility for its own destiny in the national promotion of its services. A promotional sales manager for the gas industry is a desirable end and, in my opinion, a necessary addition to our national activities in order to permit its full development. Our company has very definite views on this subject. We feel that if the Association has funds available for intangible research, it certainly should have funds for the most important phase of our industry. Its present activity in promoting the Coordinated Kitchen is a start, but only a start in this direction. There is much more to be done.



Hudson W. Reed

HUDSON W. REED became associated as industrial engineer with The United Gas Improvement Co. In 1931. In 1936 he was named executive vice president of the Philadelphia Gas Works Co., becoming president of that organization on July 1, 1942. Mr. Reed was born and educated in Lockhaven, Pa. He has had wide experience in management and engineering in many branches of the gas industry, and is recognized by the industry as an exponent of aggressive action. He is a member of the American Society of Mechanical Engineers, Engineers' Club and the Union League.

A British Viewpoint on Post-War Appliances

By J. E. WHITE, A.M.I. Mech. E.

Chief of Gas Sales, Newcastle-Upon-Tyne and Gateshead Gas Co., England

WHATEVER may be the nature of the work of research and development undertaken by the gas industry, it must be judged by the resulting benefits, direct or indirect, to the consumer.

A compliment to the gas industry is undoubtedly implied in that the average consumer turns almost automatically to it for advice on the purchase of appliances, a compliment which has probably been earned by a steadfast policy which has at all times aimed at supplying appliances which are of proved thermal and operational efficiency, at a price within the means of each class.

Whether in the post-war large scale reconstruction of the cities, towns and villages of this country, or in the rebuilding work now under immediate consideration in areas which have been subjected to heavy damage, the gas industry has before it an opportunity which is possibly the greatest which is ever likely to come its way—the opportunity of providing a complete fuel service which will be in keeping with the times and the spirit of the people. This opportunity, however, calls for wise and understanding planning.

Complete understanding and mutual confidence between the industry and the appliance manufacturers thus becomes a matter of first importance, for without it planning efforts will be of little avail. This highly desirable condition can only come about, however, if the gas industry will indicate with united voice what it requires of the appliance manufacturers, and if these manufacturers, working together in common confidence and trust, will take the industry wholeheartedly into their councils, telling the industry how far these requirements are practicable.

What Are the Requirements?

What then are the requirements of the gas industry in respect of appliance design and supply? The following remarks are but an attempt to express the outlook and needs of one provincial undertaking, but it is hoped that the opinions expressed will form the basis of a discussion which will clearly indicate the national trend of thought in such matters.

When discussing appliance design it is all too easy to make use of the term "efficiency" in that limited sense which considers only work done against thermal input. The loose employment of the term has unfortunately been often misleading, and consequently there has been a tendency to reach out toward high thermal efficiency as the only goal whilst overlooking the equally important factor of "operational" efficiency.

Obviously, it is the desire of the industry to offer low running costs to its consumers, but these are quickly lost sight of if they are bought at the cost of reliability of operation. Consumers are generally appreciative of the appliance servicing which is freely provided by many undertakings, but such service rapidly loses its attraction if skilled attention is required once every three or four months to keep the appliance up to concert pitch—it certainly has no charm for the undertaking which has to foot the bill.

For many years there has been a slogan in the industry with regard to the final exit of sulphur; it is of vital importance that the same dismissal be given to appliance maintenance, which is by no means impossible if care in design be coupled with the recommendations of the committee of inquiry on gas quality of the Institution of Gas Engineers.

Water Heaters

Happily, the need for maintenance does not apply in an equal degree to all gas appliances, but in water heating, for example, there is room for much improvement. It is quite unnecessary that the present complexity of design and overload should persist and it is suggested that as the character of town gas is conducive to high thermal efficiency, the first requirement of a gas water heater is simple, rugged construction coupled with dimensions which are proportionate to the duty to be performed.

J. E. WHITE, chief of gas sales, Newcastle-Upon-Tyne and Gateshead Gas Co., England. Excerpts from paper printed in "The Gas Times" and presented before the 80th Annual Meeting of the Institute of Gas Engineers, London..

Details are given of a water heater of the circulator pattern, which is the result of an attempt to fulfill this specification in that whilst it is lightly loaded in its normal form, when operating at 15,000 Btu. per hr. it is capable of immediate stepping up to 20,000 Btu. per hr. by the simple exchange of the burner jets should any change in circumstances necessitate a greater supply of hot water.

In service on the 15,000 Btu. rating, the heater has shown itself capable of working over prolonged periods under arduous conditions which have led to the failure of the more complicated types; yet with a minimum of maintenance the initial efficiency has been well maintained. In the stepped-up version of 20,000 Btu. per hr., the equivalent of the normal consumption for nine months (30,000 cu. ft.) was passed, the heater receiving no maintenance whatever, and upon stripping it was evident that a further three or four months of service could have been undertaken without risk of a falling off in operational efficiency, or any serious effect upon its combustion characteristics.

Space Heating and Cooking

The efficiency of utilization of the heat produced by the combustion of gas in fires is an important factor in determining their adoption for domestic heating. Consequently, in this field the development of the highest practicable thermal efficiency coupled with corresponding operational efficiency is of the first importance.

The appliance manufacturers are fully alive to the potentialities, as is evident from reports which are circulating concerning the development of gas fires incorporating an increased measure of convection heating (in a manner which will overcome the troubles which have been associated with this method in the past), yet retaining the radiant heat which is so acceptable to many, and the introduction of automatic temperature control operated by both factors.

In cooker design, thermal efficiency of the oven has been much overstressed. As such a small percentage of the total gas consumed by gas cookers is ac-

counted for by the oven, cooking performance should be the criterion by which the appliance is judged, and the author would go so far as to suggest that a slight increase in gas consumption would be more than justified if an outstanding improvement in performance could be obtained.

With regard to hotplate design, there are some who consider that the hotplate of the future should be of the solid top variety; that is, either the whole or a considerable proportion of the hotplate should have a flat, unbroken surface. The problems of combustion and ventilation below hotplates of this nature are not inconsiderable, and it is doubted if the claims made for this development really justify these complications. It is therefore essential that any change in this direction be subject to most thorough district testing before its introduction to the public, and must not be allowed to become merely a sales point that is not substantiated by performance.

Rational Standardization

As a post-war development it is not difficult to foresee a standard cooker chassis which by varying external treatment will meet the requirements of many classes of consumers. Such a chassis has much in its favor, whether as a sub-unit of a complete kitchen assembly embracing cooking, water heating, clothes drying, etc., or as a unit which by progressive improvement in detail can be kept abreast of the most up-to-date practice.

The value of such a unit in hired and prepayment cookers, where the introduction of any new type is always a matter of some difficulty, is obviously great since by the simple exchange of the "overcoat" the cooker may assume the lines of its most modern counterpart. It must be remembered that there is very probably a far greater scope, too, for development in the middle and upper classes. Generally these are more receptive of new and labor saving ideas but in competition they are more "vulnerable" and consequently the standard adopted by gas must always be at least equal to the best available elsewhere; appliances in this sphere should be built up to a standard and not down to a price and there should not be the slightest hesitation on the part of the appliance manufacturer in introducing electrically operated devices if by doing so the standard of the gas appliance is raised.

From a study of many well-informed documents dealing with post-war architecture, and from practical investigation into public reactions made possible by experimental work by the author's undertaking, it is evident that unit construction of kitchen equipment is universally accepted by architect and householder alike.

Since the presentation of the paper on this subject by E. Crowther to the institution annual meeting in 1942, the attempt at unit construction illustrated therein has been inspected by more than 3000 housewives, and as a result of their suggestions and general approval, the unit has been extended so that it now embraces (a) clothes drier, (b) small drying cupboard for tea towels, etc., (c) gas cooker, (d) cooking utensil cupboard, (e) water heater and 30-gal. storage cylinder, surmounted by (f) plate warmer and (g) large dimension airing cupboard, the last named housing the ventilating canopy to which all the appliances are connected.

The services covered by this unit are not complete since they do not include clothes washing or refrigeration facilities, but it probably serves as an indication of the essential household services which can be accommodated in 7 ft. by 2 ft. 6 in. of the floor space available. This is a considerable economy when compared with the area required by individual appliances for the same service.

Unity of Purpose

As has already been shown, the principle of unit construction in domestic equipment has definite attractions for the public and the gas industry, and it has equally great attractions for the appliance manufacturer. It is, however, no small undertaking nor will it be achieved without full cooperation between all the interested parties. Perhaps then in the overcoming of difficulties and in the satisfaction of achievement, it is not too much to hope that the term "unit" may be expanded to unity — the unity of purpose of two great industries, the futures of which are indissolubly joined.

New AGA Advertising Campaign Starts This Month

"On tap for washing duds or dishes
As much hot water as one wishes!"

That is one of the little jingles featured in the new, revitalized National advertising campaign which the AGA has created to build postwar prestige now for the 5 big jobs in the home. Featuring the slogan, "This is the House that Gas Runs!" the new campaign is designed to promote gas as the *one* all-purpose fuel for the home, and between this month and June, 1945, will deliver 133,000,000 selling messages through leading consumer magazines on gas fuel, appliances and equipment to the American public.

One of the three AGA advertisements scheduled to appear in leading magazines between now and December.

Three advertisements (see cut) are scheduled for publication through December, will appear in Saturday Evening Post, (July 29, Sept. 16, Nov. 11); American Home (August, October, December); True Story (August, October, December); House Beautiful (August, October); Woman's Home Companion (August); Ladies' Home Journal (September, December); Good Housekeeping (October); House and Garden (September and November); Parents Magazine (September, November); Better Homes and Gardens (November).

In the meantime the advertising committee is turning its thoughts toward the coordinated kitchen, and if these revolutionary features of gas kitchen design materialize in the near future, a new campaign featuring these developments will get under way in early 1945.

Southern Counties To Test Customers' Cooker Gauges

Southern Counties Gas Co., Los Angeles has offered to test pressure cooker gauges for its customers, and testing equipment operated by trained crews has been set up in each of the company's districts under the supervision of H. W. Geyer, utilization engineer.

Although the campaign is just getting under way, quite a number of units have already been submitted. Customers are asked to transport the cooker top to and from their nearest company office.

Let's Protect Our Lead in the Food Service Field

By ROY E. WRIGHT

Director of Gas Sales, NEGEA Service Corp., Cambridge, Mass.

"If we lose a part of the commercial cooking load to our competitors, what effect will it have on our domestic cooking load? Surely it is important and sound to spend as much money, if necessary, to hold our revenues, as it is to spend money to add new revenues. Too little thought and attention is given by too few gas men to the retention of gas load."—Roy E. Wright.

IT is estimated that over 85% of the volume cooking in the food service field on gas company lines is done with gas. Gas has served the food service industry well and long. Because of its ideal characteristics gas has been the predominant fuel used for cooking in hotels, restaurants, and institutional kitchens for over the past decade. This is a fine record, but it was obtained only by hard work, and by prompt and efficient service.

The commercial cooking load is highly desirable, very profitable and extremely important to the gas company. Statistics show that:

1. In 1942 the commercial load represented 60,000,000 Mcf or approximately 14% of the total gas sold by the manufacturing gas companies.

2. In 1942 it represented $51,126,000 or between 12 and 13% of the total annual revenue of the manufacturing gas companies.

3. In 1942 it represented 153,226,000 Mcf or approximately 8.5% of the total gas sold by the natural gas companies.

4. In 1942 it represented $64,706,000 or between 11 and 12% of total annual revenue of natural gas companies.

5. It had an average rate of $.85 per Mcf as against an average rate of $.645 for househeating and $.451 for industrial uses in the manufactured gas areas in 1941.

6. It had an average rate of $.422 Mcf as against $.660 for domestic uses including househeating and $.179 for industrial uses including power generation in the natural gas area in 1941.

7. The commercial cooking customer requires only a small investment and overhead in comparison with the average account.

8. The commercial customer has a fine load factor with an all day, year-around gas load.

9. The high average rate and the large size of the average account make the commercial cooking load a highly desirable business for every gas company.

The gas industry has had this load for so long that many gas men have settled back in smug complacency with a feeling that the load is rightfully theirs and nothing can happen to it. These Rip Van Winkles may wake up and find that the horse has been stolen.

Unfortunately our competitors have no such illusions. They are fully cognizant of the value and many attributes of the commercial cooking load. They can see that this field offers possibilities of greater progress with less effort in a shorter period than others. They are concocting their plans now to go after this business in the postwar era. Excess capacities and surpluses will make possible special low rates and prices for our competitors. The attack will be violent and supported by large volumes of promotional propaganda. Any inroads by competitors must necessarily be made at the expense of the gas companies. Any attack on this gas load, regardless of how concentrated, strong and vociferous it may be, can be successful only because of the inertia of the gas company.

The gas companies should look forward with confidence and optimism in this field because gas alone is ideally suited to meet the many requirements of the food service business. Speed, diversity of use, controlability, low maintenance, low operating cost, any degree of turn down, no storage space requirements, and ease of application are some of the many needs of a fuel in a hotel, restaurant or institutional kitchen. Gas alone possesses all of these attributes. That is why it has enjoyed the distinction of serving this field almost exclusively for so many years. That is why gas should continue to dominate this field in the postwar period. All that is needed is energetic, intelligent promotion and the rendition of good service by every gas company.

The gas industry must show by action that it is entitled to hold this business. Words will not suffice. Our knowledge that gas is the superior fuel for this market will avail us nothing unless we can prove to the satisfaction of our customers that it is fact. It must be remembered that our competitors tell our customers only what they want them to hear. Scientists tell us that if you tell a man the same thing seven times he begins to believe it, even if it is untrue. Our competitors are expounding this theory to the limit. The ludicrous propaganda that modernity necessitates the use of a certain fuel is typical. It is sheer bunk but some people believe it. What are you as a gas company doing to discredit this nonesense?

Promotional activities cost money. The preservation of this valuable gas load will require real promotion. Many gas executives have been hesitant about spending much money on the commercial load. There is not much new possible potential to be gained. It is hard for most people to become excited about something they already have. There is seemingly not much of any return on an investment in promotional activities in this field. Is not this reasoning fallacious? Is it not as important, if not more so, to hold the load we have as it is to gain a new load in another field? What do we gain if we lose revenue in one field as fast as we add it in another field?

SOME SUGGESTED NEEDS FOR THE PRESERVATION OF THE COMMERCIAL COOKING LOAD.

1. The importance of good customer service now during the war. Good will creates a good customer attitude and upon customer attitude depends to a large degree the fuel to be selected after the war.

2. Each gas company should make a survey of its food service customers to determine the conditions of his appliances, their age, the customer attitude and generally to determine its market with particular emphasis on those places which need immediate attention.

3. Support the national gas advertising and publicity programs.

4. Build up a good relationship with kitchen equipment dealers.

5. Prepare to train an adequate crew of salesmen in all the technical details of a modern kitchen.

6. Prepare and have ready an aggressive sales promotional program.

7. See to it that your customers know the facts about gas and competitive fuels to meet competitive propaganda or false claims.

8. Make sure that all comparisons given a customer are on a fair comparable basis.

There can be no excuse for the loss of the commercial gas load. Gas is the only fuel which meets all the requisites of the food service proprietor. It is universally recognized as the superior fuel for this work. Only complacency can defeat us.

The principal objective of The Food Service Equipment Committee of The American Gas Association for the last year and a half has been to attempt to awaken the industry to the reality of its position in the commercial cooking field. The gas companies have had this business so long that many gas men believe that it is their inherent right to always have it. They can not see how any other fuel could possibly be used for this work. They can be due for a sad awakening. The Food Service Equipment Committee realizes that many progressive gas companies are awake to the dangers confronting them in food service kitchens and are constantly preparing to meet the threat. Likewise the committee knows that there are other gas companies that do not realize the significance of the potentional dangers and are doing little to prepare to meet them. These companies invite attack.

The gas industry is an old conservative business inclined to wait until the horse is stolen before it gets its mad up. Once aroused to righteous indignation it has always done a good job. Let us reverse the procedure and lock the door first this time. If proper precautions are taken now we need have no fear for the future. The time to think and prepare to meet this situation is now.

The Billion Dollar CP Range Question

By JAMES I. GORTON

Advertising Consultant for the CP Gas Range Manufacturers

THE American Gas Association estimates that more than eight million gas ranges need to be replaced immediately after the war. New home construction will create the need for another three to four million ranges in the first five to 10 years after we are back into peacetime production. If you figure these 11 to 12 million ranges only at $70 each (the average selling price of CP Gas Ranges in 1941 was $125), you arrive at a figure pretty close to a billion dollars. That's a big market. That's worth shooting for.

In 1941 gas range sales totaled 2,300,000 units which retailed over $160,000,000. An indication as to how those ranges were sold is shown in Table 1.

To establish greater consumer and dealer acceptance for gas cooking and for CP Gas Ranges, there are six things I believe gas utilities must do, and they must start to do them now.

First: They must have more consumer and dealer advertising and promotions to obtain greater consumer and dealer acceptance. This advertising must be of an informative nature, so as to broadcast the new developments in gas appliances. Only in that way can you rapidly change peoples habits of judging gas appliances by models that are 8 to 10 years old.

Second: You must broaden your trade contacts. One or two dealer meetings a year and an indefinite dealer policy will never get you the support of the gas range dealers in your territory.

Third: The industry must have more adequate trade and consumer magazine contacts so as to obtain publicity. And when I say publicity, I don't mean free articles now and then. I mean creating a consciousness and appreciation for CP Gas Ranges among editors and advertisers that will reflect itself in every article, promotional piece, and advertisement. You must convince editors and advertisers that the CP Gas Range has consumer acceptance and demand. No editor is going to write about a product that he thinks people don't want—no advertiser is going to show a gas range in his illustration if he thinks the public wants an electric range.

Fourth: You must have an intimate knowledge of what each one of your customers wants and needs and you must convince each customer that you can supply his wants and needs better and more easily than anyone else.

Fifth: You must engender enthusiasm among your employees, salesmen and dealers. That enthusiasm must start with top management.

Sixth: You must have adequate sales training and a compensation plan that will enable the new salesmen you employ to make a better living selling gas appliances than they can selling something else. That's the only way you will be able to attract and hold the kind of salesmen you are going to need.

TABLE 1. GAS RANGE OUTLETS

Sales figures based on a survey made among manufacturers who manufactured and sold approximately 1,000,000 gas ranges in 1941.

Outlets		*% of Total Units Sold*
1,200	Gas Utilities	32%
18,000	Appliance Dealers	23%
2,900	Department Stores	15%
19,900	Furniture Stores	17%
29,147	Hardware Stores	13%
8,000	Architects	
10,000	Builders	
19,000,000	Customers	100%

NOTES

Of the 18,000 electric specialty dealers, approximately 10,500 are Class A outlets who sold $5000 or more in appliances in 1941—*Electrical Merchandising.*

Of the 19,900 furniture stores, 5245 do 75% of the business. The 19,900 did an annual business of about $973,157,000 in 1939 of which 6.4% was "stoves and ranges."—*National Retail Furniture Association.*

Approximately 2900 department stores sell major appliances—*Retail Home Furnishings.*

The 29,147 hardware stores have a gross volume of $629,276,00. 80.1% sell "stoves, ranges, (including electric and gas) burners and stokers" valued at $33,350,000. Of the 29,127 stoves, 30.1% or 8770 do 71.6% of the total hardware business—*U. S. Census of Distribution* 1939.

There are approximately 22,000 architects of whom 8000 can be considered "working architects." Of the large number of builders, 10,000 do 80% of the home construction business — *Architectural Forum.*

To help utilities establish better consumer and dealer acceptance the CP manufacturers are promoting more actively the program which has been so successful this year in keeping the CP story alive.

They will have a booklet describing what CP stands for to be used by dealers and gas utilities to distribute to home planners, dealers, architects, and to send out in response to the growing number of inquiries received by AGAEM.

The CP manufacturers have expanded their trade paper schedule and included important publications that will give practically complete coverage of the 40,000 more important range outlets and the 8000 builders and 8000 architects whose influence will be vitally important to range sales after the war.

To get the most out of this expanded CP promotional program and to line up your dealers for more aggressive sales of better grade gas ranges after the war, I suggest you mail the CP Business Building Plan Kit to every range dealer in your territory. It costs only 30c a dealer. Surely, in the important days that lie ahead convincing a dealer of the future profit possibilities of selling CP Gas Ranges is worth 30c.

A FREE APPLIANCE REPAIR PROGRAM

By G. A. SAAS

Public Relations Director, Citizens Gas & Coke Utility, Indianapolis, Indiana*

IN March, 1943 the Citizens Gas and Coke Utility inaugurated its Free Appliance Repair Plan as a war-time service policy. This paper deals with its inception, operation and experiences garnered in the past 12 months.

Anv successful war-time service plan must have three elements: It must (1) help the war effort; (2) be profitable for the customer: (3) be profitable for the utility. The Free Appliance Repair Plan has all these elements.

1. It is definitely a policy that will conserve gas appliances, keep them in operating condition during the war and thus help the war effort by reducing the demand for new ranges, refrigerators and water heaters.

2. A free service plan during war-time shortages, when men and materials are at premium, performs a much appreciated service for the customer and saves him money.

3. As for the Utility's angle, maintaining satisfactory gas service, in spite of old appliances is not only good business but a moral obligation. The response has been so overwhelmingly favorable that a long-lasting impression has been built which we hope to translate into satisfied gas customers tomorrow.

The plan isn't revolutionary. It is nothing more nor less than the elimination of labor charges on service orders where repair parts are involved. It is different only because it runs counter to the accepted theory that because of labor shortages and full pocketbooks, service to the customer can be or should be curtailed. The plan was launched on March 20, 1943 and the first advertisement appeared a month later.

Developing the Plan

The Free Appliance Repair Plan started with a lot of conferences, digging into the records and the weighing of intangible possibilities. General Manager T. L. Kemp suggested a meeting of minds early in January, 1943 to discuss ways and means of inaugurating the plan, to forecast costs and to discuss possible trouble and expense that might be encountered. The distribution superintendent, the acting sales manager, and the public relations director sat down and explored the situation.

At that time, like most gas companies, our service policy included free inspections and adjustments, but a time and material charge when parts were involved. Time was charged to the customer at $1.00 per hour, material at cost plus 15%. In 1942 an average of 37 service request calls were made per 1000 meters per month.

To properly evaluate the situation we were getting into, an appliance work order analysis was made of actual orders handled in January, April, July, and October of 1942, showing labor, auto, and all overhead costs. Projecting these figures for 12 months gave reasonably accurate cost figures on a normal yearly volume of repair orders where parts were involved.

*Presented before the Indiana Gas Association Annual Convention, May 15, 1944.

This "Free Service" Offer
Will Keep Your Gas Appliances
In Repair For The Duration!
The Gas Utility considers it a patriotic duty to help keep your gas appliances in operating condition for the duration of the war. Gas appliance manufacturers are making war materials now . . . your present gas range, water heater or refrigerator MUST last. Here is what we will do:
Inspection, Adjustment, Repairs . . . Free
At your request, Gas Utility service men will call at your home and inspect, adjust or repair your domestic gas appliances (range, water heater, gas refrigerator). NO MATTER WHERE THEY MAY HAVE BEEN PURCHASED, at absolutely no cost to you for labor.
Replacement Parts at Actual Cost . . .
If materials or repair parts are needed, they will be ordered for you and installed free. You pay only the actual cost of the material or the repair part itself. If no material or parts are needed to repair your appliance, the work will be done free.
Phone MA. 4421 for "Free Repair Service"
There are no strings to this offer. Work will be done in the order in which requests are received, on regularly scheduled runs in the city. All we ask you to do is be patient. Such an offer will bring a flood of calls, and we will handle them as soon as possible. This offer and your co operation will keep the "gas appliance front" in tip-top condition for the duration of the war.
CITIZENS GAS & COKE UTILITY

Sample of advertising used by Citizens Gas and Coke Co. in conducting their Free Appliance Repair Plan.

Analyzing the labor that was available, it was determined that we could handle approximately 5500 appliance work orders at an estimated cost of $12,000 per year.

Many other possibilities were discussed, such as the usual unappreciative attitude of the customer towards something "free," credit losses, losses that might be sustained because of the refusal of the customer to accept a part when it arrives, and the possibility of so flooding our service department with calls that we couldn't handle them. Experience showed that none of these things actually happened.

War-time poor service, a general attitude of discourtesy in stores, waiting in line and accepting substitutes so conditioned people, that the expected customer attitude of taking a "free" service for granted never materialized. On the contrary, our policy was so different from the customers' experience elsewhere, that a larger number than usual expressed appreciation and thanks for our service. Again, war-time living conditions so changed people's pocketbooks and thinking that in a full year's time we have had only 27 accounts over three months old, amounting to $50.16, and none of this is considered uncollectible. There were only five cases where parts ordered were not accepted and in these cases the wait for the part was so long that some customers had moved, or sold their appliance or the part was different from that ordered. Such parts if frequently used, were kept in stock and the others returned to the factory for credit.

Controlling Service Requests With Advertising

Much to our surprise, we discovered that service requests can be satisfactorily controlled with advertising. We found no customers who took undue adavantage of our free offer; the ones who responded actually needed repairs or adjustments, and as the service department became busy we dropped the ads, only to pick them up again when work tapered off. To guard against a jam of service orders all our ads stipulated that we would route the calls and make them at our convenience as soon as possible. In

They are no more efficient nor courteous than they were before the war, but because this free service is unusual and unexpected, customers seemingly look at our representatives, too, through rose colored glasses.

Appliance Survey

Killing two birds with one stone, as it were, a survey of customer appliances is made by the repairman when he responds to a Free Appliance Repair order. A simple, mimeographed, 3x5 file card is used for this purpose.

Information which will be of a helpful nature to appliance salesmen in the future is recorded on the card from observation only, without asking questions. The make, age and condition of the appliances are checked off in spaces provided for this purpose and the card is then filed by the sales department. We don't know just how valuable these cards may become, but such a survey can be conducted as a side-line without the expenditure of additional time or money.

It may be interesting to note that a spot check of 100 survey cards shows the age of gas ranges serviced to be between 3 and 35 years, averaging 13.7 years. The refrigerators in these homes, both gas and electric, have an average age of 6.3 years. 27% of these customers had automatic water heaters, 61% had side-arm heaters and 12% had no water heater at all. These figures are not to be considered as representative of the city as a whole. As a matter of fact, information from 100 cards can hardly be termed thorough, but it is obvious even from such a superficial check, that many home appliances are becoming old and wearing out. The owners of these ranges, refrigerators and water heaters and those who now have no means of heating water at all will be our best prospects tomorrow. It seems to us very important just how these folks will feel toward us. Accurate or not, this spot check does indicate the existence of a substantial postwar appliance market.

With a year's experience behind us we feel the Free Appliance Repair Plan's cost of $12,849 to have been a worthwhile expenditure. In fact, we cannot think of a better way to spend money on good-will. The plan helps the war effort at home, helps the customer and helps us.

We think of good public relations as having to overcome three hurdles: First, of course, the disadvantage of furnishing service on what the public likes to think of as a "monopolistic" basis. It seems to have become a part of human nature to look for trouble when coming in contact with a utility.

Second, living down past mistakes. The public forgets many things easily enough, but it has an elephant-like memory for what it terms "injustices." The mistakes of the past, unfortunately, die very slowly.

And third, we try to remember the toughest hurdle of all: That good news travels slowly. It is human nature that bad news is news and the topic of bridge table conversation, but that good news is not worth repeating. Bring your wife a dozen roses and no one will notice or comment on the fact. But try beating her up . . . and you'll be the talk of the town.

We look upon the Free Appliance Repair Plan as a means of improving gas service, as a tool with which to bring about better public relations. And we hope against hope that if we give our customers a dozen roses often enough, they'll consider such a good piece of news worth talking about.

Plastic Pipe for Natural Gas Service

THIS DISCUSSION on plastic pipe took place at the Conference on Construction and Maintenance, Technical Section, Pacific Coast Gas Association, San Francisco, March 8-9, 1944.

PLASTIC pipe, available in considerable variety, is generally of two types, Thermo-setting (cast forms) and Thermo-plastic (extruded forms).

An extruded plastic pipe is undergoing tests by the Southern California Gas Co. at the present time. Among the earliest test results available on this pipe they have found: (a) The tensile strength to average about 5000 psi; (b) The bursting strength averages between 650 and 825 psi; (c) The crushing tests (of their own devising) average 275 psi; (d) The 1-in. pipe will not buckle except under a radius of 12 in.

This same pipe was subjected to pull tests under two conditions—one of 865 lb. pressure at 84° F and another of 383 lbs. at 130° F.

It was interesting to find that at the end of four month's time in service, the crushing tests averaged 260 lbs. compared to 275 lbs. earlier. There was no appreciable change in tensile or bursting strength, and none in bending.

When this pipe was subjected for a period of 19 or 20 days to a bath in oil, it showed no softening. Later tests, in which the pipe was immersed for a period of time in nitric and sulphuric acids, and also in salt solutions, showed there was no softening effect noted. However, when immersed in an atmosphere of Calodorant and natural gas under conditions of some 1000 times normal concentration, softening was noted and tests indicated that the pipe had weakened to about two-thirds of its original strength.

In a sample burial test, 75 ft. of plastic service pipe was run through some 38 ft. of 1¼-in. steel pipe. No troubles were experienced in making this installation. In the six months this test has been in progress no leaks have developed. Contrary to certain Eastern water companies' experiences it was found that rats did not attack exposed plastic pipe.

Other test samples were buried in sand, loam, adobe (both wet and dry) and in oiled sands, the purpose being to note effects of such burial over a period of years. In order to detect possible effects of alternate exposure to light and dark, a coil of this plastic pipe is kept in the storeroom and periodically exposed.

Compared with 1-in. wrapped steel pipe with an average cost of 10c per ft. and weighing 1.75 lbs. per ft. 1-in. plastic pipe of the kind tested costs approximately 8.5c per ft. and weighs only ⅛ lb. per ft. These prices, of course, are for purchases in small quantities. One and one-half in. pipe of the Thermosetting kind costs about $2.23 per ft.

Available sizes range from 1½-in. maximum to something less than 1/16-in. minimum. The wall thickness of smaller sizes remains approximately the same as for larger sizes, with obvious increased working pressures possible for the smaller sizes.

It was found that the plastic pipe tested would burn while it was under a flame but would not ignite otherwise. This becomes a definite disadvantage in possible above-ground installations. The plastic is a non-conductor of electricity.

From the standpoint of actual installation, it appears that plastic pipe is easier and faster to install than either steel or copper. Bell and spigot joints proved preferable. The problem of joining plastic to plastic is relatively simple. Acetone is used as a solvent and joints thus produced result in about 95% strength. Joining plastic to steel pipe, however, required the development of a suitable economic adapter. The end of the plastic pipe has to be tapered to make use of this adapter, and when the joint is made up the tension on the pipe makes for a tight fit.

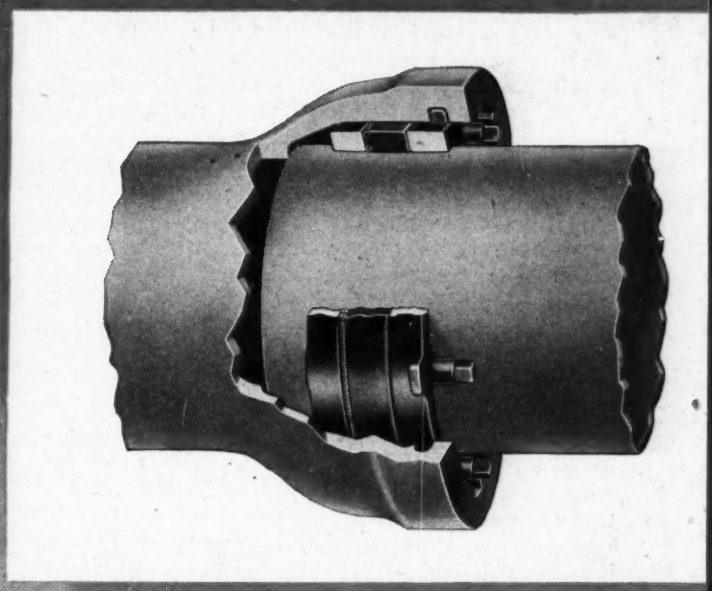
Light-Weight and Easy-to-Handle

DRESSER Bellmaster Joints

Style 85

FOR CAST-IRON PIPE LINES

This 6" Dresser Bellmaster only weighs 8 lbs.



Above you see a workman holding a 6 inch Dresser Bellmaster (weight, 8 lbs.) just as it reached the storeroom—a completely factory-assembled unit, ready for work.

It will take the workman no more than 2 to 5 minutes to make up the permanently tight pipe connection. He has only to wipe out the bell, insert the Joint, wipe and stab in the spigot, and tighten the capscrews with a small wrench. No bell-holes needed.

The cutaway view illustrates the working principle of this new mechanical Joint. A resilient gasket is compressed between two light, strong, malleable rings and against the pipe, by capscrews. This effects a constant, flexible seal, bottle-tight even under unusual conditions of expansion, contraction, deflection and vibration.

Thus effectively the ancient problem of cast-iron pipe joining has been solved. The Joint itself, locked in the bell of the pipe, is safe from attack by corrosion. CIP lines are given new protection from leaks and breaks —new operating efficiency.

Grooves rough-cast in the inner circumference of the bell accommodate the locking lugs, and slots on the face of the bell permit lug passage. Your regular source of supply can furnish Bellmaster pipe—and we are ready to make prompt delivery of Bellmaster Joints. Sizes 3", 4", 6", 8", 10", 12", 16" CIP.

INQUIRIES CORDIALLY INVITED

DRESSER MANUFACTURING COMPANY • BRADFORD, PA.

ONE OF THE DRESSER INDUSTRIES

FORECASTING GAS SENDOUT

Determining Daily, Monthly Demands for Various Weather Conditions

E. S. BRYANT and M. FRANK KNOY

Municipal Gas Department, City of Long Beach, California

UNDER peacetime conditions alert gas utility management always anticipates its gas needs several seasons ahead, attempting to assure full service to the consumer in spite of such factors as rapid community growth, increased industrial and commercial activity, possible temporary interruption of gas supply, as well as severe and unusual weather conditions. It is a tribute to the engineers and executives of the industry that they have usually provided for these contingencies in advance, and full and uninterrupted gas service has come to be a normal expectancy on the part of domestic and commercial consumers.

Now that gas has become an essential defense commodity and is used so extensively in the production of various war materials, an uninterrupted supply to war industries has taken precedence over every other consideration. At the same time utility managements retain the old sense of obligation to the domestic consumer and are just as anxious as ever to assure him adequate service.

The peak load problems of normal times are accentuated by the fact that not only do we have the new war industries to look after, but commercial and industrial consumers as a whole have experienced a tremendous increase in business. In addition we find here in Long Beach that the average consumption per domestic meter has increased considerably since the outbreak of war, due no doubt, in part at least, to the improved economic status of many families.

Accurate Load Forecasting Vital: In Long Beach we have all the problems enumerated above to contend with, and the question arises as to whether we can meet possible peak demands on our system with the available gas supply with no increase in our pre-war storage and transmission facilities. Hence we began to cast about for a dependable method of load forecasting.

In the past we have attempted to correlate gas sales for the month with total deficiency degree days, but without much success. Because our meter readings are spread rather evenly over the month, heavy gas sales are frequently reflected in the month following the coldest weather.

To eliminate this source of error we decided to approach the problem from an entirely different angle. We start with the assumption that all gas taken into the system is sent out. Thus the net gas received for the month is regarded as the sendout for the month. Since all gas purchased is accurately metered into the system, we can establish our starting point as a definite quantity.

Breakdown of the Sendout: We know that certain elements of the sendout are fairly constant; others are ascertainable in advance, still others vary sharply. We must therefore analyse the load and isolate the various elements for study.

First we set up our so-called line loss. This is taken as the average monthly discrepancy for the preceding 12 months between total net gas metered into the system and that metered out—in other words, the average monthly unaccounted-for gas.

This unaccounted-for gas comprises actual leakage and certain losses due to metering at distribution pressures, temperature shrinkage in cold weather, and slow meters. The largest elements are no doubt leakage and metering under regulated pressure without correction. These remain fairly constant throughout the year. Hence we will not be far wrong to consider the unaccounted for gas for the month in question as being representative of one-twelfth of the total for the preceding 12 months.

E. S. BRYANT, assistant superintendent of the Long Beach Gas Department, first became affiliated with the gas business in California in 1909 when he entered the employ of the Southern California Gas Co. as civil engineer in charge of construction. In 1915 he became assistant gas engineer with the California Railroad Commission, and during the ensuing years worked alternately for the Commission and Los Angeles utilities. He was appointed engineer of designs for the Long Beach utility in 1923, becoming assistant superintendent in 1928.

FRANK KNOY, who holds a B. S. from Texas Christian University, has been combustion engineer at Long Beach since the middle 1930's. He has been a frequent contributor of engineering articles to GAS

Next we isolate the industrial load. In our case these meters are read on the last day of the month, and their corrected readings are an accurate record of industrial consumption for the month. This load may also be accurately estimated for a month or two in advance.

There is another load element which for the purpose of this study we have assumed to be constant. This is the non-space-heating domestic and commercial load. This consists mainly of cooking, water heating and gas-fired refrigeration. We will not be far wrong in assuming this load as constant per meter month by month. If there is any increase for cold weather it will vary up and down with the deficiency degree days and can thus be lumped in with the space heating load and correlated with temperature.

The final sendout component is what we may call the heating load, or that which varies more or less consistently with the deficiency degree days. If we can establish any rational correlation between this element and the deficiency degree days we shall then be in a position to assume any weather condition for the future and forecast the monthly or daily sendout.

To summarize, we break the sendout down into line loss, industrial load, and so-called cooking or household load, which we assume to be constants, and the load element that varies with the weather, which for simplicity we shall call the heating load. Our forecasting formula would then look like this:

$$S = MC + I + L + (VMD) \qquad (1)$$

in which

S=The total gas sendout for the month.

C=The cubic feet per meter per month used for cooking, water heating and refrigeration. (Based upon previous August use.)

M=Number of domestic and commercial meters in service.

I=Industrial load estimated from present and recent past experience.

L=Line loss based upon average monthly unaccounted-for gas for previous twelve months.

V=Cubic feet per meter per month per deficiency degree day increase in gas consumption over the previous August.

D=Total deficiency degree days for the month.

TABLE 1. VALUE OF F ON MONTHLY BASIS FOR FOUR YEARS*

Month	1940 Deficiency Degree Days	1940 Factor F	1941 Deficiency Degree Days	1941 Factor F	1942 Deficiency Degree Days	1942 Factor F	1943 Deficiency Degree Days	1943 Factor F	Four Year Average Value of F*
January	262.2	.00558	287.6	.00508	325.2	.00535	325.1	.00541	.00535
February	229.5	.00520	213.4	.00490	333.1	.00465	212.1	.00487	.00491
March	175.2	.00475	183.9	.00441	297.5	.00462	199.7	.00479	.00464
April	125.1	.00361	196.5	.00383	193.8	.00461	156.3	.00416	.00405
October	36.3	.00518	96.1	.00472	44.3	.00659	70.8	.00375	.00505
November	179.6	.00493	164.9	.00526	184.9	.00426	153.6	.00497	.00485
December	218.8	.00585	320.3	.00531	321.3	.00465	288.5	.00517	.00524

*For use on daily sendout formula multiply this Value of F by the number of days in the month in question.

TABLE 2.

Month	Value of F	Number of Meters in Service (M)	Cu. Ft. Gas Per Meter Per Month Previous August (C)	Deficiency Degree Days (D)	Industrial Gas Actual Mcf. (I)	Line Loss Mcf. (L)	Calculated Sendout by Formula 2 (S)	Actual Sendout Based on System Intake	Error in Mcf.	Error in Per Cent
December, 1943	.00524	62,962	3475	288.5	134,303	25,340	710,843	705,354	5490	.78% high
January, 1944	.00535	63,213	3475	334.8	143,549	24,270	780,819	770,268	10,551	1.37% high
February, 1944	.00491	63,371	3475	349.1	140,232	35,400	773,032	752,648	20,384	3.7 % high

F=Average for past four years. Three year average for December.
M=Domestic and commercial meters.
D=Defficiency degree days based upon the mean of 24 hourly reading per day of a sheltered thermometer at one of our plants.

Variation in V and C: In trying to ascertain the value of V and C for the coming heating season, we naturally had to rely on the statistical method and see what past experience would indicate. Here we ran into real difficulty, as we found that both C and V varied from year to year, and rather widely over a period of years. Thus C for August, 1936, was 2350 cu. ft. per meter and for August, 1943, it was 3475 cu. ft. per meter. V for dry weather in January, 1937, was 14.57 cu. ft. per meter per deficiency degree day, whereas a recent dry day gave 17 cu. ft. per meter per deficiency degree day. This is such poor correlation that we felt we must use another approach.

Due to a change in our main source of gas supply and to a more thorough removal of heavier gas fractions at the casinghead gasoline plants, the heat value of the gas distributed has declined approximately 10% since 1936. Better economic conditions and fuller building occupancy have caused a further increase in the volume of gas used per meter. It is assumed, therefore, that these same factors will tend to increase the heating load per deficiency degree day. In order to get away from variations in heat value, economic conditions and average building occupancy, it was decided to express the increase in gas used per meter per deficiency degree day not in cubic feet but as a decimal fraction of the previous August use. This worked out surprisingly well. The formula now becomes—

$$S=MC+I+L+(FMCD) \qquad (2),$$

in which

the letters have the same meaning as stated above except that F is the increase in gas used per meter per deficiency degree day expressed as a fraction of the use per meter in the preceding August. It is thus assumed that there is normally no radical change in heat value of the gas, building occupancy and general economic conditions between August and the following heating season. At least, not as much as there would be over a period of years. The graph Fig. 1, shows the value of F for the past four calendar years.

Determination of C: The use of gas per meter per month for August may be determined in various ways. If actual meter readings are to be used

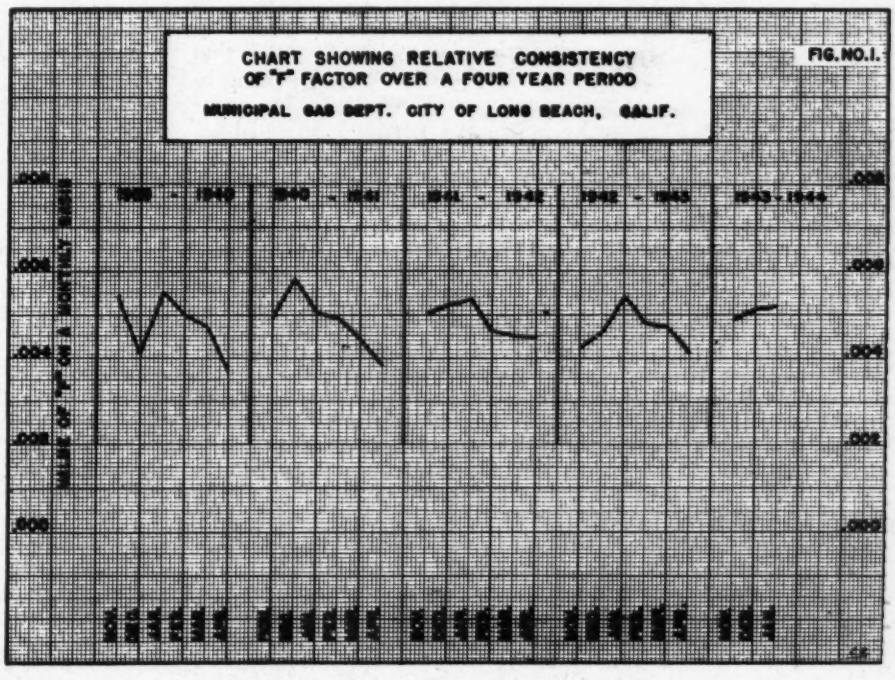


CHART SHOWING RELATIVE CONSISTENCY
OF "F" FACTOR OVER A FOUR YEAR PERIOD
MUNICIPAL GAS DEPT. CITY OF LONG BEACH, CALIF.
FIG. NO. 1.

we would suggest that the average of the three summer months, July, August, and September, be used in order to level out any discrepancies due to irregular reading, holidays, etc.

In order to get away from these irregularities it was considered that the net sendout was the same as the net taken into the system. Thus in summer S=MC+I+L, the heating load component FMCD being entirely absent. The theoretical cooking load can then be found by difference, thus:

$$MC=S-(I+L) \text{ and } C=\frac{S-(I+L)}{M} \quad (3)$$

The cooking load per meter per month as thus determined checks closely with the actual average metered sales for the summer.

Determination of F: To determine F for any heating month in the past the formula becomes

$$S=MC+I+L+FMCD$$

whence

$$FMCD=S-(MC+I+L)$$

and

$$F=\frac{S-(MC+I+L)}{MCD} \quad (4)$$

The values of F for Table 1 were thus determined for the heating months for four calendar years.

It will be noted that as a rule December and January have a higher value for F than do the spring months. This is no doubt due to the reduced hours of sunshine for those months. Likewise it will be seen that extremely wet months, like December 1940, for example, give higher values for F than do average or dry months. It must, therefore, be borne in mind when forecasting the sendout for a given month to use the average factor for that month.

A glance at formula (2) will reveal that the variable (FMCD) is what we are trying to forecast, since the other load components are known. To check as to how well this variable component could be correlated with deficiency degree days, graph Fig. 2 was prepared.

We take the individual monthly sendout, break it up into the various load components and solve for the heating load thus:

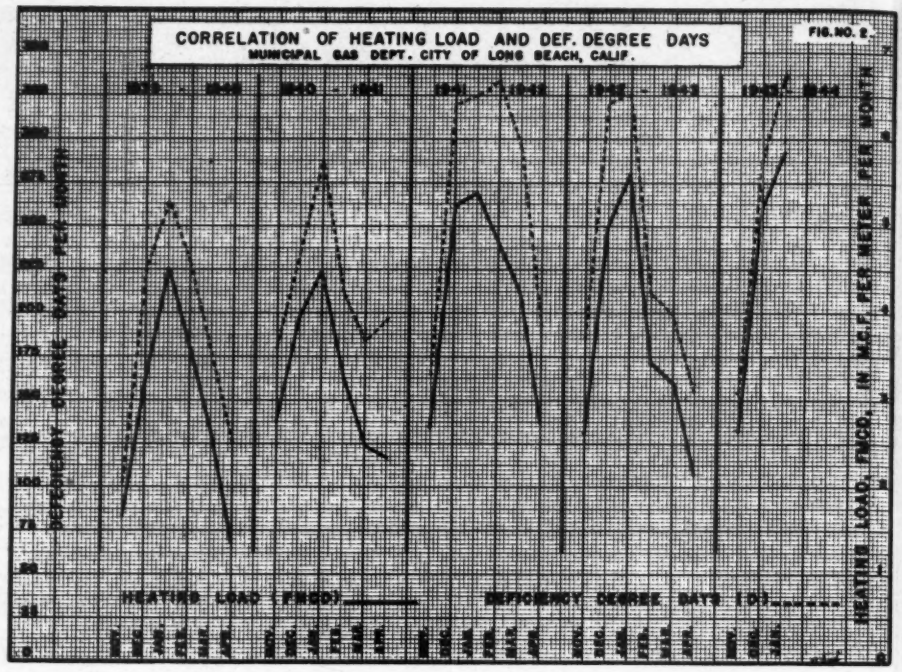
$$S=MC+I+L+(FMCD)$$

and

$$FMCD=S-(MC+I+L) \quad (5),$$

The heating load is then plotted along with the deficiency degree days. The close correlation between the two will be apparent from a glance at the graph.

This consistent relation between FMCD and temperature over a period of years convinces us that our method of load breakdown is sound and sufficiently accurate for forecasting purposes.


CORRELATION OF HEATING LOAD AND DEF. DEGREE DAYS
MUNICIPAL GAS DEPT. CITY OF LONG BEACH, CALIF.
FIG. NO. 2
HEATING LOAD (FMCD)
DEFICIENCY DEGREE DAYS (D)
HEATING LOAD, FMCD, IN M.C.F. PER METER PER MONTH

Forecasting Monthly Sendout: Having provided ourselves with this yardstick for forecasting monthly sendout, it will be interesting to see how accurate it will prove. For the winter of 1943-44 it has been very accurate indeed, as will be seen from a study of Table 2.

The calculations were made from the actual deficiency degree days experienced. Assuming that the formula is correct, accurate load prediction will depend largely upon accurate temperature predictions. The one thing we do not claim for the formula is that it can be used for weather forecasting. However, granted a deficiency degree day forecast that we can rely upon we believe that the formula will enable us to anticipate our gas demands with sufficient accuracy for practical purposes. Lacking such a forecast, the prudent thing would be to use an average of several severe seasons in the past—say the average of the three most severe winters for the past 20 years.

Forecasting Peak Day Sendout: To forecast the sendout for a single day we use the same formula wherein the components C, I, L and S are all expressed on a cubic feet per day rather than per month basis, and a value of F, calculated as above, found on a daily basis.

For more accurate daily forecasting we have distinguished between rainy weather and fair weather. Taking days of recent occurrence of such weather and a known sendout and solving for F, we get .1778 for wet weather and .1521 for dry weather. High wind of storm proportions of all-day duration coupled with some sunshine and a little rain, which occurred in January, 1944, gave a value for F of .2215.

It is interesting to note from Table 1 that the average value of F for the past four Januaries is .005355; if we convert this to a daily factor by multiplying by 31, we get .1660 as the four year average daily factor for January. Now if we take the mean of the rainy day factor .1778 and the dry day factor of .1521, we get .1649, which is almost the same as the average daily factor for the past four Januaries.

For average conditions our forecast sendout for a day of 45° F mean temperature in January, 1944, would be: S=MC+I+L+(FMCD) =6300 x 112+4,500,000+816,000+ (.1660 x 63,000 x 112 x 20)=35736 Mcf. with all industries on, or correspondingly less for any industrial curtailment.

Increase in Load Per Deficiency Degree Day: Having ascertained an average value of F on a daily basis, as well as a value for wet and a value for dry days, we are now in a position to calculate the increase in load per deficiency degree day. Thus the heat load FMCD varies as the value of D, or it increases FMC for each degree increase in D. Thus the average increase in load per deficiency degree day on our present system with approximately 63,000 meters and a daily value of 112 cu. ft. for C, will be .1660 x 63,000 x 112=1171 Mcf. per day. For dry weather it will be .1521 x 63,000 x 112=1061 Mcf. per day, and for wet weather it will be .1778 x 63,000 x 112=1255 Mcf. per day.

THE UNDERGROUND STORAGE OF GAS

A Resume of the Principal Projects in the United States and Canada

By E. G. DAHLGREN

Technical Secretary, Research and Coordinating Committee
Interstate Oil Compact Commission

IN 1942 the Research and Coordinating Committee of the Interstate Oil Compact Commission made a survey of production, conservation, and utilization of natural gas in the member states. In its report presented at the 1942 autumn quarterly meeting at Chicago, the Committee recommended the greater use of depleted or near depleted oil and gas reservoirs for natural gas storage and conservation.

Subsequently, in 1943 the Committee decided to collect information on underground natural gas storage projects which culminated in the preparation of a report entitled "A Survey of Underground Natural Gas Storage Projects in the United States" which was published in the October 1943 Interstate Oil Compact Quarterly Bulletin. At the winter quarterly meeting in December, 1943, the Committee decided to bring the survey up-to-date.

The writer is presenting this paper in behalf of the Research and Coordinating Committee.

Underground storage of natural gas is being utilized more and more each year by the gas and oil companies. J. French Robinson[1] recently estimated that there are 50 or more natural gas storage areas in the United States. Robinson also states that as of December 1, 1943, the underground gas storage capacity of the areas now in use for that purpose was 135 billion cu. ft. with a delivering capacity of 750 million cu. ft. per day.

According to the Bureau of Mines 1942 Minerals Yearbook, Natural Gas Chapter, approximately 15 billion cu. ft. were stored underground in 1940, while approximately 16¼ billion cu. ft. were stored in 1941. It is estimated that almost 19 billion cu. ft. were stored in 1942 and over 8 billion cu. ft. in 1939.

The importance of underground gas storage in the war effort cannot be minimized. The vital industrial areas of the Cleveland-Pittsburgh-Wheeling region obtain part of their gas supply from that source. Peak demands might not have been met if gas stored underground had not been available for use. The same situation prevails in the industrial area about Kansas City.

From the conservation standpoint underground storage is beneficial in enabling the transfer of gas into storage from highly competitive areas where flush production might encourage uneconomical use of the product on account of a need for an immediate market. Underground storage is beneficial to the small stripper gas wells, especially in the Appalachian area, which can only be operated economically if they are used every day. When domestic markets are curtailed in the summer months, these wells would be shut in if underground storage was not utilized. The abandonment of many of these wells has been avoided because they can now be produced with at least a small profit by using them daily.

The storage operations in the Bow Island field in Alberta, Canada are a striking example of gas conservation. About 12 billion cu. ft. of gas was stored from the Turner Valley high pressure naphtha wells which had been venting to the atmosphere approximately 250 million cu. ft. of residue gas daily after the gasoline and naphtha had been extracted. The ideal solution is to return the gas to the oil producing horizon to maintain the pressure.

As many gas producing states limit the production of gas to approximately 25% of the open flow capacity, underground storage can be utilized to prevent heavy withdrawal from gas wells in periods of peak demands.

Ratable taking can be furthered by utilizing underground storage in periods of low markets. Regulatory agencies in the states have had difficult problems to solve in adjusting allowables to insure each producer his share of the pool's market demand.

Information has been obtained on many underground storage projects throughout the nation and Canada. The latest available information on these projects is presented to add to the published material available. The writer trusts that material on hitherto unpublicized projects will be of interest.

Arkansas

S. R. Walker, vice president, Arkansas-Oklahoma Gas Co., has kindly furnished information on their underground storage project in the Lavaca gas field.

This field, near the town of Lavaca, is located in Sections 21, 22, 27, 28 and 29, Township 8 North, Range 30 West, Sebastian County, about 15 miles east of Forth Smith.

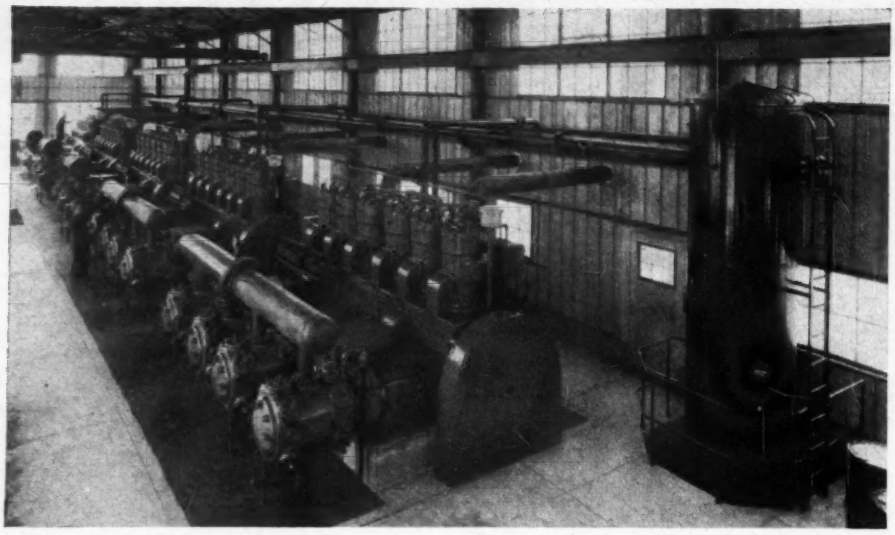
Details regarding the field and storage operations were given in the survey by the Research and Coordinating Committee of the Interstate Oil Com-

[1]J. French Robinson, "The Storage of Natural Gas," West Virginia Engineer, the West Virginia Society of Professional Engineers, Charleston, February, 1944, p. 18-21 also *GAS*, June, 1944, p. 29.

E. G. Dahlgren

E. G. DAHLGREN, was born at Rice Lake, Wisconsin. He was graduated from the University of Wisconsin with a B.A. in Geology. He entered the oil industry in 1930 in the Oklahoma City field with the Indian Territory Illuminating Oil Co. In January, 1931 he joined the Oklahoma City Producers Association, the proration enforcement agency in the Oklahoma City field. With the passage of the oil and gas conservation law in 1933, he and others in the organization were absorbed by the Oklahoma Corporation Commission. He served as a Deputy Proration Umpire and Chief Clerk in the Oil and Gas Conservation Department until June, 1937, when he accepted the opportunity to become director, Conservation Division of the Kansas Corporation Commission at Wichita. In 1939 he went to Washington as an Oil and Gas Valuation Engineer with the Securities and Exchange Commission. He became a Petroleum Development Analyst in the Production Division of the OPC in July, 1941. In February, 1942, he resigned to become Technical Secretary of the Research and Coordinating Committee of the Interstate Oil Compact Commission at Oklahoma City. He became Assistant Secretary of the Commission in January, 1944.

Mr. Dahlgren's discussion supplements a general article on Underground Storage by J. FRENCH ROBINSON presented in GAS, June, 1944, p. 29.



Interior view of Robinson Station showing five 600-hp. units.

pact Commission.[2] The field produces from the Atoka (deep) formation of Pennsylvanian Age at an average depth of 2900 ft.

California

Pacific Lighting Corp. The La Goleta dry gas field of this company, which lies on the Pacific Coast just north of Santa Barbara and 105 miles from Los Angeles, is equivalent to a storage tank covering 300 city blocks, towering 400 ft. into the air, holding gas at 2000 psi. At the present time, a $4,000,000 pipeline is being constructed to insure gas for war production in Los Angeles next winter.

Goleta appeared to be a very tight sandstone formation with a porosity of about 20%, and although some 15 billion ft. of gas had been drawn from it, it still held high pressure and was losing capacity due to water encroachment at not more than one-half of 1% a year on withdrawals as they then stood. To test the formation for repressuring, Pacific Lighting installed compressors capable of injecting about 30 million ft. a day. The fittings of the few wells that were on the scene were replaced with fittings of 3000 lbs. working pressure.

What Pacific Lighting has now undertaken to do is immediately to increase the injection capacity from the present 30 million ft. a day to 66 million ft. a day and by a new pipeline running in sections of from 16 to 18 in. diameter tie the field further into the Los Angeles area system.

The line will increase deliverability of Goleta gas, original or stored, from about 60 million ft. a day to upwards of 200 million ft.

Experience has shown that depth pressure in the field rises about one pound for each 30 million ft. of gas injected. The original well head pressure is calculated to have been about 1700 lbs. The intention is to take surplus gas at all low consumption periods and pump it back into Goleta. A pressure of 2000 lbs. is considered safe and feasible, perhaps more. It may even be that old capacity of the field may be restored.

Southern California Gas Co.: Much interest has been manifested in the Playa Del Rey storage project in the Los Angeles Basin area. With war industry establishments in the Los Angeles Area dependent almost entirely on natural gas for fuel, the variation between the summer and winter demands provided the stimulus for seeking ways and means of storing natural gas to provide additional gas during the winter season. The writer is indebted to E. F. McNaughton, director, Public Utilities Department, California Railroad Commission, R. D. Bush, State Oil and Gas Supervisor, California Department of Natural Resources, Wm. Moeller, Jr., vice president, Southern California Gas Co., and Prof. John F. Dodge, University of Southern California for their assistance in furnishing information on the Playa Del Rey Storage.

In 1943, after a joint survey by the California Railroad Commission and the California Department of Natural Resources, the Playa Del Rey Oil field was selected for a storage reservoir because of its location near the load center of metropolitan Los Angeles, its proximity to a natural gas trunk line, its geological structure, and the near depletion of its producing zone. The field is located on the shore of the Pacific ocean about two miles southeast of the beach community of Venice, a part of the City of Los Angeles.

During the month of December, and especially during the last week of that month, the gas utilities in that area experienced the highest sendout in their history, necessitating the curtailment of practically all gas sold on an interruptive basis. During this emergency the Playa Del Rey storage was on the line and performed very creditably considering all the factors.

On December 8 the maximum net storage was in the amount of 1,695,286 Mcf. The reservoir well-head pressure at this point was 811 lbs. The following statistics for the month of December are of interest.

	Mcf
Stored in 17 days	40,684
Withdrawn in 12 days	115,161
Net withdrawal for the month	74,477
Maximum rate of withdrawal per hour	1,500
Maximum withdrawn per day (12/9)	24,769
Net gas delivered to storage as of 1/1/44	1,616,316

It is believed that no definite statement can be made regarding the economic outcome of the project until at least one complete cycle of storage and season withdrawal has been completed.

Kansas

Fuel shortages in the Kansas City area in the winter of 1942-1943 focussed attention on the underground storage fields operated by the Cities Service Gas Co. The report and the records of hearings held by the United States Senate Special Committee to Investigate the Fuel Situation in the Middle West reveal interesting information on the importance of these storages.

Cities Service Gas Co.: D. A. Howard, superintendent of production, Cities Service Gas Co., has contributed data on their four storage reservoirs in Kansas. The combined volume capacity of these reservoirs is estimated at 24.7 billion cu. ft.

The Company has four dry gas storage fields in Kansas, named and located as follows: Boyer, located in Township 26 South, Range 5 East, Butler County; Craig, located in Township 12 South, Range 23 East, Johnson County; North Welda, located in Township 21 South, Range 19 East, Anderson County; and South Welda, located in Township 22 South, Range 19 East, Anderson County.

The Boyer Storage reservoir is a sand found at about 900 ft. in the Shawnee group of the Pennsylvanian Age. The type structure forming the reservoir is a dome, known as the

[2] "Survey of Underground Natural Gas Storage Projects in United States" by Research and Coordinating Committee, Interstate Oil Compact Quarterly Bulletin, October, 1943, p. 65-67.

Boyer Dome. The volume capacity of the reservoir is estimated at 1,200,000 Mcf. The field has a total of 18 input and output wells. The first injection of gas into the depleted field occurred June 27, 1929.

The Craig storage reservoir is the Bush City sand found at about 600 ft. It is in the upper part of the Cherokee shale of Pennsylvanian Age. The type structure is a combination of anticlinal fold and sand lensing. The volume capacity of the reservoir is estimated to be about 5,000,000 Mcf. The field has a total of 48 input and output wells. The first injection of gas into the reservoir was in May, 1931.

The North Welda reservoir is the lenticular Colony sand found at about 900 ft., near the center of the Cherokee shale of Pennsylvania age. The volume capacity of the reservoir is estimated at 8,500,000 Mcf. The field has 41 input and output wells. The first injection of gas into the reservoir was on May 22, 1934.

The South Welda storage reservoir is the lenticular Colony sand found at about 900 ft., near the center of the Cherokee shale, and is of Pennsylvanian Age. The volume capacity of the reservoir is estimated at 10,000,000 Mcf. The field has 84 input and output wells. The first injection of gas into the reservoir was on July 19, 1937.

Union Gas System, Inc.: Vernon Palmer, manager, Pipe Lines, Union Gas System, Inc., has kindly furnished information on their two underground storage facilities in Chautauqua and Wilson Counties in Kansas.

The Longton storage centers in Section 10, Township 32 North, Range 12 East, Chautauqua County, Kansas. The sand averages 650 ft. in depth, and runs from 10 to 20 ft. in thickness in lenses, the sand thinning out into shale.

The initial rock pressure in 1916 was 260 lbs. The pressure was down to 32 lbs. when repressuring was begun. Wells initially gauged from 1000 Mcf to 4000 Mcf open flow. Repressuring began in March, 1940, and the pressure as of January 1, 1944 was built up to 164 lbs., with 1,377,062 Mcf having been put in storage. Nineteen storage wells are connected.

The deliverability starts at the rate of 4500 Mcf per day and settles down in 24 hours to the rate of 3000 Mcf per day, at which time the pressure on the pumps is 40 lbs.

The Buffalo storage is located in the Northwest quarter of Section 17, Township 27 North, Range 16 East, Wilson County, Kansas. Five storage wells are connected.

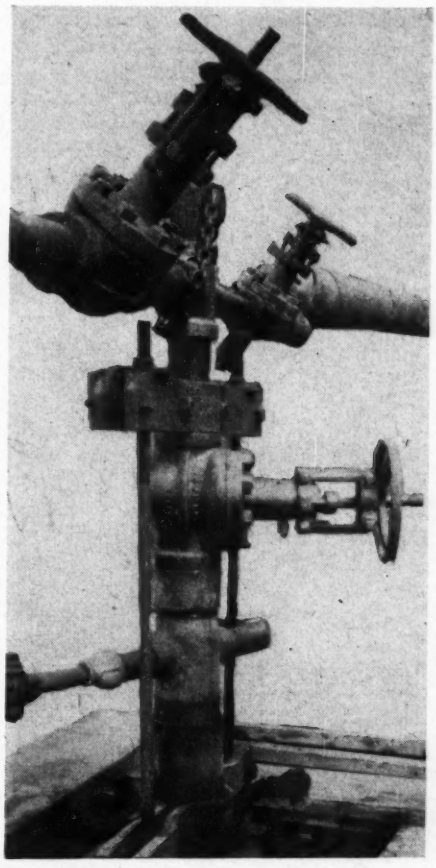
The production is found at 180 ft. in depth in a sandy lime of approximately 50 ft. in thickness. The field was drilled about 1919 with initial open flows of 150 to 250 Mcf. The records do not indicate the initial rock pressures, which are believed to be 60 lbs.

The field had been fully abandoned after pulling the pressure down to zero, and when the first wells were drilled in December, 1941 to experiment on storage, the pressure was still zero. The first well was left open for several days before it began to produce any gas.

Gas was injected with line pressure of 50 lbs. on April 29, 1942, and by January 1, 1944 had fed in, without pumping on simple line pressure, 105,146 Mcf, and the rock pressure was up to 46 lbs. A compressor was installed to pump out the gas, and the deliverability is now at the rate of 1000 Mcf per day, pulling the pressure down to 15 lbs. The formation seems to yield the gas quite readily, and it absorbs the gas like a sponge.

Kentucky

No new information is available on the underground storage reservoirs operated by the Central Kentucky Natural Gas Co. of Lexington, and the Louisville Gas and Electric Co. at Louisville.



A typical injection well in a storage pool.

The Central Kentucky Natural Gas Co. utilized the Menifee field in Menifee, Montgomery, and Powell Counties in eastern Kentucky as a storage reservoir. This field, covering an area of approximately 13,000 acres, was used for storage purposes from 1919 to January 1, 1931 when storage operations were discontinued.

R. E. Stouder, geologist, Louisville, Gas and Electric Co., reports that their gas storage reservoir, located about 30 miles from Louisville, has been successful since 1931 and that losses have been negligible. The field is a small dome with a closure of about 150 ft. and covers 350 acres.

Michigan

Two underground storage reservoirs are in operation in Michigan. The Michigan Consolidated Gas Co. operates an underground storage reservoir in the Austin field of Mecosta County. The West Michigan Consumers Co. operates a small underground storage reservoir in the Muskegon field.

Through the courtesy of Glenn R. Chamberlain, first vice president, Michigan Consolidated Gas Co., information on the Austin Gas Storage project has been furnished by Max W. Ball, Consulting Geologist, who supervised the original study of the field's suitability for storage purposes and has kept in close touch with the project.

The Austin gas field lies in Townships 14 and 15 North, Range 9 West, in Mocosta County, about 5 miles southeast of Big Rapids and about 50 miles northeast of Muskegon. Before being used for storage it was the sole source of natural gas for Big Rapids and the main source for Muskegon. In addition to Big Rapids and Muskegon, it has pipe line connections with Grand Rapids, Lansing, and a number of smaller cities. It is also connected by pipe lines with the Winfield, Six Lakes, Reed City, Lincoln, and Freeman Gas fields.

The field is now owned and operated by Michigan Consolidated Gas Co. The discovery well was drilled on May 1, 1933 by Taggard Bros., Inc. Gas deliveries to Big Rapids were begun on February 4, 1934, and to Muskegon in February, 1935.

Beginning on April 7, 1941, gas, from the Lincoln-Freeman fields, and later from the Reed City field, has been injected into the Austin reservoir. Input was suspended from December 9, 1942, to April 12, 1943 and on four occasions minor amounts were withdrawn. With these exceptions input has been continuous. A total of 4,200,000,000 cu. ft. has been injected and the pressure has risen to 505 lbs.

The field has met all storage demands so far made on it and gives every indication of being a wholly satisfactory storage reservoir.

New Mexico

Van Thompson of the Southern Union Gas Co. of Dallas, Texas, has kindly furnished information as of January 1, 1944, on his company's Keyes storage project in the Red Lake Area of Eddy County in New Mexico.

The storage area comprises 400 acres with four injection wells. Natural gas is injected under natural well pressure from the pipe line of the Lea County Water Co., which obtains the gas from the Hobbs field in Lea County. The pipe line has a maximum capacity of about 400 Mcf per hour.

On actual tests, between 250 Mcf and 300 Mcf per hour have been withdrawn for a period of eight hours with the assistance of a 400 horse power compressor. About 150 Mcf can be withdrawn without the use of the compressor.

With the use of the storage project and the compressor the Southern Union Gas Co. has the equivalent of a pipe line with a capacity of 650 Mcf per hour for peak demand.

This winter, 1943-44, is the first one in which gas has been withdrawn to any extent, and only in December during peak days and for short periods at a time. No information is available at this time as to losses.

New York

C. A. Hartnagel, State Geologist of New York, has kindly contributed information on underground gas storage areas in New York.

The first storage project in New York, now operated by the Iriquois Gas Corp. of Buffalo, New York, is located in the Zoar field about 25 miles south of Buffalo, in Erie County. This gas field was discovered in 1907. The gas wells were about 2000 ft. deep and produced from the Onondaga (Devonian) limestone and the underlying Silurian (Salina) formations.

By 1918 the rock pressure of the field had decreased to such an extent that the wells were delivering a small quantity of gas in the main transmission line with a line pressure of 90 lbs. to the sq. in.

At this time (1918) relatively high pressure gas from the nearby Medina sandstone wells in the towns of Collins and North Collins was injected experimentally into the wells in the Zoar field.

The gas injected into the Zoar field wells was carefully measured and all of the 45 million cu. ft. gas stored was recovered in addition to a recovery of 40 million cu. ft.

The successful results obtained in the Zoar field proved the practicability of underground storage. Several other storage projects in the Medina gas fields have been developed, but details are not available at this time.

In the Wayne-Dundee field of Schuyler County, the eastern or Dundee section was used as a storage reservoir about three years ago. The Oriskany sandstone is the storage horizon. The wells in this field discovered in 1930, range in depth from about 1700 to 2100 ft.

In the town of Greenwood in Steuben County, two wells on state-owned land are now used for underground gas storage. The gas is stored in the Oriskany sandstone at a depth of 4700 ft. The first well was drilled in 1934 with an initial daily production of 15 million cu. ft., and a rock pressure of 1900 lbs.

Storage operations began about 1940. The large natural production obtained from the wells and the high rock pressure indicate their large storage capacity.

John A. Thompson of the Belmont Quadrangle Drilling Corp. has informed me that his company has three storage projects located as follows: (1) Dundee Storage Field, approximately 2500 acres located in Tyrone Township, Schuyler County. (2) A Single Well Storage Field located in Greenwood Township, Steuben County. (3) A Single Well Storage Field located in Wirt Township, Allegheny County.

Ohio

Information on underground natural gas storage projects in Ohio has been obtained from J. French Robinson, president. East Ohio Gas Co.; K. C. Cottingham, chief geologist, The Ohio Fuel Gas Co., and E. O. Schillhahn, geologist, Manufacturers Light and Heat Co.

East Ohio Gas Co.: East Ohio has been using the Chippewa area since the latter part of 1941 for underground storage. The limits of this pool are completely controlled by stratigraphic trapping. The area covers approximately 6000 acres with 18 active wells operated in conjunction with with a 1020-hp. compressor station.

Storage actually began in this pool in the latter part of 1941 when the rock pressure was 416 lbs. This pressure has been built up to 1000 lbs., and at this pressure, the total amount of gas in storage is 6 billion cu. ft., which includes 3.25 billion cu. ft. of gas reserves in the area at the time underground storage started.

East Ohio is developing a new storage area in the former Stark-Summit gas field in Stark County. This area is still in the experimental stage. A 3000-hp. compressor station has been constructed to be used to force gas into the reservoir and also to be used for withdrawing gas from storage. Several wells are being equipped for injecting gas. Certain areas of the Stark-Summit gas field have been selected in which the open flow of the wells is large. It is hoped that the gas injected in these wells will not migrate too far in order to build up the pressure with a reasonable amount of gas.

The East Ohio Gas Co. now controls the entire area which covers 45,000 acres and contains 576 gas wells. Storage of gas was commenced in the latter part of 1941. As of June 20, 1942, the total amount of gas produced from the field was 160,000,000 Mcf and the remaining natural gas reserves was estimated as 32,000,000 Mcf. It is hoped that the pressure can be built up in certain areas of the field to obtain for peak day use a withdrawal of 50 million cu. ft. of gas per day.

The Ohio Fuel Gas Co.: This company operates the Benton Storage area in Hocking County and the Perrysville Storage area in Ashland and Richland Counties. The Benton storage of three pools contains about 10,000 acres and storage operations began in 1936. The Perrysville area of three pools contains about 11,000 acres, and storage operations began in 1936.

In 1943 nine storage wells were drilled. On December 31, 1943 the total number of storage wells was 133. The total volume of gas in storage of 18½ billion cu. ft. on October 1, 1943 had decreased to 16 billion cu. ft. on December 31, 1943. The total volume of gas stored on December 31, 1943 was 47 billion cu. ft., while the total volume removed on the same date was 31 billion cu. ft.

Mr. Schillhahn has informed the writer there is no change in the data on the Brinker field storage in Columbiana County which is operated by the Manufacturers Light and Heat Co. This field, a dome type reservoir in Berea Sand, comprises 717 acres with 12 wells.

(This discussion of the underground storage facilities throughout the United States and Canada by Mr. Dahlgren will be continued in the August issue of G A S. In that issue Mr. Dahlgren will take up specific underground storage projects in Oklahoma, Pennsylvania, Texas, West Virginia and Alberta, Canada. G A S will also present in the August issue a bibliography of papers on underground storage).

CORROSION AND PROTECTION

Of Buried Metallic Structures

Compiled and Abstracted by GUY CORFIELD, Technical Editor, GAS

3. Pipe Coatings

The Electronic Holiday Detector

D. E. STEARNS, engineer, United Gas Pipe Line Co. Excerpts from a paper "The Electronic Holiday Detector" prepared for fifth Bureau of Standards Soil-Corrosion conference, St. Louis, March, 1943.

THE electrical means of locating holidays or points of failure in pipe coatings has come to be known as a holiday detector.

Work was begun about five years ago by the writer in an attempt to develop a detector which it was hoped might some day be considered by the industry as ideal. The watchwords were: rapid, thorough, dependable, and simple. Electronics seemed the answer in view of the small amounts of electricity which would have to be relied upon for control of the operational functions desired, and the unit thus developed has been named the Electronic Holiday Detector.

Description of Assembly

The complete EHDetector assembly, weighing approximately 120 lbs., consists of the following principal operational component parts:

1. The Instrument—enclosed in a wooden case 12 in. by 12 in. by 8 in. high containing the high voltage generator and automatic electronic apparatus with associated electro-mechanical controls, bell alarm, panel light indicators, and register.
2. Wet-cell storage battery.
3. Carriage of cast aluminum 14 in. wide by 23 in. long with resilient rollers and insulated handles.
4. Rotor Assembly attached to the end of the carriage used to propel the exploring electrode.
5. Exploring electrode composed of spring wire close wound with male and female connectors at respective ends adapted to be conveniently engaged and disengaged.
6. Trailing ground chain.

The assembly is illustrated in Fig. 1.

In placing the EHDetector in operation, the exploring electrode is tossed around the pipe and the connectors are engaged, forming an "in line" annular form. A different length of exploring electrode is used for each size of pipe and is such that the spring is under slight tension when thus connected. The carriage is placed on the pipe with the instrument and battery mounted thereon. The rollers are adjusted to fit the pipe to be inspected and are locked in this position. The rotor assembly is attached to the end of the carriage and adjusted to the proper level so that the hardened steel rollers contacting the exploring electrode bear against it at a contacting point 45° with the horizontal. The two hardened steel rollers, one on each side of the exploring electrode, are mounted in brackets which are backed up by buffer springs in order to maintain positive contact between the rollers and the exploring electrode as the carriage rolls over irregularities in the coating of the pipe.

The trailing ground wire is attached to a terminal at the side of the carriage, which in turn is connected to the ground terminal of the instrument. The trailing ground wire is snapped onto the terminal provided on the side of the carriage and consists of a short section of insulated wire to which is connected a ground chain about 30 ft. long.

The assembled apparatus rolls along the top of the pipe line on the coating, the rotor assembly attached to the end of the carriage and fitting over the exploring electrode, causing the exploring electrode to roll over the circular surface of the pipe coating as though it were being rolled over a flat surface, thus assuring complete coverage of the coating being inspected. The rollers under the carriage are formed from rubber having a bearing surface 2 in. wide moulded to the average size curvature of a 12¾ in. O.D. line and are soft so as to spread under the weight supported and to thus satisfactorily seat themselves on pipe of any diameter without injury to the coating. Mechanical means are such that the position of the rollers can be quickly adjusted to fit the size of pipe to be traversed. In order to assure ease of propulsion, each roller has two sealed ball bearings mounted in the ends and simply supported in a cast bracket by means of a through bolt.

The rotor assembly for propelling the exploring electrode has two hardended, stainless steel rollers mounted with ball bearings, as in the case of the rubber rollers, and fit one on each side of the exploring electrode, allowing it to be rolled forward or backward with equal ease. The high voltage conductor lead from the generator to the electrode rotor contactor is only 16 in. long and is suspended in air, so that no variable losses occur in this portion of the circuit. The electrode propelling rotor is electrically insulated from the main frame of the carriage by a grooved micarta block of suitable size, and the handles are electrically isolated from the main frame of the carriage by suitable mechanically stable insulating means in a manner such as to reduce all capactive effects to inappreciable value.

The Instrument Case

The instrument case is further electrically insulated from the main frame of the carriage by means of rubber toes, and the storage battery, which sits directly on the carriage base, is, of course, of electrically nonconductive substance. Thus, the instrument containing the high voltage generator and detection components, the primary power supply consisting of the storage battery, and the main frame of the carriage are all electrically insulated from each other, and together are all insulated from the operator, ground, and the member being tested, except by such other intentional means of connection as necessary.

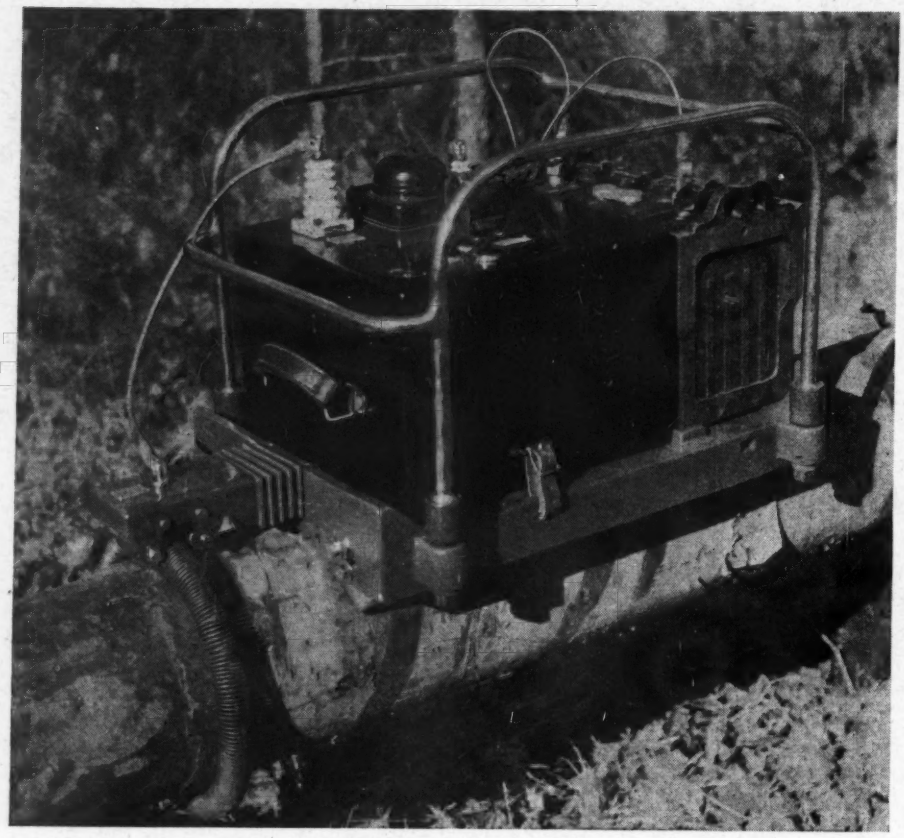


FIG. 1. The complete electronic holiday detector assembly.

Operation

The EHDetector is operated efficiently by two men: (1) the operator who attends to the single control and pushes the machine along—acting as observer on one side of the line; and (2) his helper who acts as observer on the opposite side of the line and unsnaps and re-connects the exploring electrode at obstructions such as pipe line supporting members. Balancing of the machine on the line is made easy by a relatively low center of gravity and by the fact that the soft rubber rollers grip the coating, or wrapper thereon, and thus prevent tipping or lateral movement of the assembly. The detector rides down the pipe line with easily propelled, rapid motion, while assuring thorough inspection coverage by means of the close wound spring exploring electrode. Because the EHDetector rides the pipe line, it administers consistently uniform inspection regardless of terrain—that is, it does the same work in a swamp or across water as though it were being used across a cultivated field and, of course, is moved along with equal ease under any condition. In cases where water crossings were encountered, operators have preferred to follow along the top of the pipe in back of the EHDetector, balancing themselves by grasping the handles and walking in a stooped position.

All manually controlled functions of the EHDetector are handled by one properly marked control knob having an off position and four operative positions. When first put into operation the instrument requires a warm-up period of about 15 to 20 seconds. This is accomplished by turning the control knob from off position to position marked (1). Generation of high voltage output, and energization of a red panel light indicating such, is accomplished by rotating the control knob to position (2). If the control knob is set at position (3), the bell alarm will ring when a holiday is encountered, and if the control knob is set at position (4), the register will record or count each time a holiday is encountered. If the control knob is inadvertently initially moved directly to position (2), (3), or (4), no damage can result because generation of high voltage is automatically delayed until the instrument has warmed up.

Now as the EHDetector is rolled along the pipe, the control knob is set at position (4) and as explained above, in the event of encountering a holiday the bell alarm will ring, and the register will record one time. The control knob is thereupon turned back one notch to position (3), and as the EHDetector is rolled back to locate the holiday, the register will have been made inoperative so that when the holiday is again encountered during such return motion, the register will not recount the same holiday. In case it is desired that the bell alarm be de-energized, the control knob is simply moved back another notch to position (2).

After finding and marking the specific location of the holiday on the pipe, the EHDetector is again rolled forward with the control knob returned manually to position (4), and inspection is continued along the line. The specific location of the holiday must be ascertained by sound and sight, but the observers are assured by indications of the instrument that a holiday actually exists somewhere within a narrow area on the periphery of the pipe. Experience has shown that in case of definite knowledge of existence, the observer is able to quickly locate the fault or holiday. Areas of coating surface between holidays along the line need not be examined by the observers at all since the EHDetector performs this service electrically.

Preliminary Test

An idea of the speed and effectiveness of the machine may be gained from the fact that on a preliminary test made some time ago, a 2000 ft. section of 8 in. pipe was inspected in one hour total elapsed time, during which 360 holidays were encountered, located, and marked. This section had previously been gone over twice with a conventional detector having high voltage means only—once to look for holidays and once again to check the section after such holidays that had been found were repaired. All of the holidays of this group of 360, which were closely examined, indicated a reason for their existence as such, that is, they consisted of spots of carbonized particles in the body of the coating, broken bubbles, checks, holes, skips, etc.; and it may well be emphasized here that the EHDetector positively does not cause or produce holidays in sound coating by means of electrical overstress.

A certain short test piece of 8 in. pipe having a normal coating thickness of coal tar enamel has been used during experimentation in the laboratory and has been subjected to high voltages produced by the EHDetector circuit for possibly as much as 50 hours altogether. The voltage has been impressed on the coating by means of a stationary electrode and the fact that no sign of breakdown has ever occurred in this 50-hour period seems to be rather positive evidence that the coating material has not been damaged

by electrical stress. The sensitive electronic means which have been adapted to indicate the presence of holidays by causing definitely audible and visual signals, are not effected unless there is an actual visible spark discharge produced at the holiday, the order of high voltage intensity produced by the EHDetector being that which is generously sufficient to permit easy visual location of the holiday after it has been indicated by the electronic means.

In designing the EHDetector it was considered that high frequency is ordinarily not necessary because of the relatively slow motion with which the exploring electrode applying the testing voltage is normally moved over the insulating coating being tested. Therefore, in the interest of conserving the energy of the primary source of power, i.e. the storage battery, as much as possible, and with the knowledge gained thus far from practical experience in the field in operating the EHDetector on cross country pipe line coating inspection work, it has been determined that 30 testing impulses per second are sufficient to provide adequate inspection coverage, i.e. the high voltage exploring electrode is not normally moved over the insulating coating fast enough to skip any appreciable surface between testing impulses when such are occurring at the rate of 30 per second.

Oscillatory Generator

The generator used in the EHDetector is an oscillatory surge generator which produces 30 oscillatory surges per second. The oscillatory surge, as viewed on the screen of an oscilloscope, has an initial impulse of extremely steep wave front which increases at a uniform rate from zero to a sharp pointed peak or crest value within a few micro-seconds, then rapidly decreases to zero potential, reverses polarity and reaches a second crest value greatly reduced in voltage value from the original crest value, then decreases to zero, reverses polarvalue from the original crest value, of still further reduced intensity, then decreases to zero, reverses polarity—and so on until the oscillations of the surge have completely died out.

In application of the EHDetector the initial impulse of each oscillatory surge is considered as the testing voltage, there being, as described hereinabove, 30 of such sharp crested steep front impulses each second. This rate of occurrence could be increased, if desired, but more power would be required from the storage battery. In other words, the problem was, on one hand, a matter of supplying impulses often enough to thoroughly inspect the coating without skips between impulses during motion of the exploring electrode along the pipe, and, on the other hand, a matter of conservation of power, i.e. of using as small a current drain as practicable from the storage battery in generating the high voltage impulses.

Physical Skips Covered

Of course, the exploring electrode actually moves over some coating between impulses, but the voltage impulses which are applied by the cross sectional circular close wound spring constituting the exploring electrode, are sufficient to lap over these physical skips. The high voltage generator of the new EHDetector has been developed only just recently and, so far as is known by the writer, is entirely different from any other in use at the present time for such application.

As the EHDetector is moved along the line, 30 initial impulses of uniform peak voltage value and of such form as described above are applied each second to the surface of the coating by means of the exploring electrode, and upon encountering a holiday the high voltage is extinguished immediately upon the formation of a spark produced by one individual initial impulse with simultaneous actuation of the bell alarm and the register. The high voltage remains off for about one second and then is automatically turned on again. If the exploring electrode has moved past the holiday by that time, the high voltage continues at the rate of 30 such initial impulses per second, but if the exploring electrode is still near enough to the holiday, one spark will form from an individual initial impulse, and the high voltage will again be extinguished before the time comes for a succeeding oscillatory surge to be generated.

It is to be understood of course, that the audible and visual signals are directly actuated by the storage battery, such action being indirectly controlled by the formation of a spark at the holiday by means of electronic components within the instrument. The feature of immediate cut-off of high voltage is a factor which protects the coating from carbonization at the holiday. In event the exploring electrode runs off the coating onto bare pipe, the bell alarm is steadily actuated until the direct electrical connection between the exploring electrode and the bare pipe is again broken.

Battery Provides Power

All electrical power is provided by the storage battery. Inadvertent reverse polarity connection of the storage battery to the input terminals of the instrument results in no change in operation except that the voltmeter needle is thrown off the zero end of the scale. A standard 95 ampere hour —8 volt D.C. wet-cell storage battery is utilized for high voltage output and in such extreme case provides an ample source of power at a demand of about 8 amperes.

A few thousand volts are ample to readily discover all appreciable coating faults and to thus render ideal inspection from the owner's standpoint, providing that sensitive means of holiday indication are incorporated in the inspection equipment such as in the case of the EHDetector.

The EHDetector provides a further service in that, with its rapid inspection ability, it can be kept close behind coating operations in the field. It has been found that if an approved type of coating machine is functioning normally, it will be placing a generally acceptable coating on the pipe with few holidays, and that if something happens to the operation so as to result in abnormal placement, an increase in rate of holiday occurrence takes place. The desirability of making immediate discovery of such a condition, as by use of the EHDetector, is obvious, since corrective measures can be taken before long stretches of line have been thus poorly coated. This is a very practical consideration in the field inspection of coatings during pipeline construction where the owner wants the best job practicable and the builder must provide efficient means toward that end.

Guy Corfield

THIS DISCUSSION of Pipe Coatings is continued from the June issue of G A S. Other topics in this series which have been covered in previous issues are (1) Electrical Potential Phenomena (January, February, March); (2) Corrosion Coupons (April and May). The series will continue with sections devoted to Cathodic Protection, Theory and Research; Cathodic Protection, Application; Miscellaneous—Soil Surveys, Special Problems, Anaerobic Corrosion.

Technical Editor GUY CORFIELD is research engineer for Southern California Gas Co., a member of the AGA subcommittee on Pipe Coating and Corrosion, and a director of the National Association of Corrosion Engineers.

OPERATING IDEAS

Leak Location with Aerating Equipment

H. N. FULLER, Southern California Gas Co., Los Angeles. Described before a recent meeting of the Technical Section, Pacific Coast Gas Association.

FOR a number of years past, several sections of cast-iron mains were treated with carboseal to reduce bell joint leakage. It was desirable to clear the ground of residual or vagrant gas ahead of this treatment, so as to determine the effect of the treatment. At that time, tests were conducted to determine the ability of an aerator, utilizing compressed air, to clear the soil of residual gas through barholes. It was found that by using the Penberthy injector, that odorant injected into a barhole could be drawn through the ground and exhausted from an adjacent barhole 12 ft. distant in one mniute. Thus 100 sq. ft. of ground could be cleared of vagrant gas from one barhole.

Mercury vacuum tests (see attached chart) disclosed that 15 in. of vacuum (mercury column) could be obtained by the use of air pressure at 35 psi. This method of aeration was used and definitely assisted in reviewing results.

Tests were then conducted by various gang foremen to determine practicability of using the aerator to locate isolated leakage. The most conclusive experiment was:

In one block, 20 barholes were drilled 10 ft. apart, and gas concentrations existed as follows:

100% concentration	9 barholes
90% concentration	5 barholes
85% concentration	1 barhole
80% concentration	4 barholes
75% concentration	1 barhole

After aerating, gas concentrations returned at once in three separated barholes, and did not return in the remaining 17 barholes. Excavations were then made at the points of gas concentration, and leaks were located within 1 ft. of the barhole requiring a minimum of excavating. It was found from various tests, that the aerator was efficient in all types of soil.

As a result of these tests, each maintenance crew, operating with compressor equipment, has been furnished an aerator.

The aerator used is an adaptation of the Penberthy Injector used to inject water into boilers. Several key points of our use are:

1. Pointing the discharge pipe directly upward to avoid blowing the odors into a nearby building.

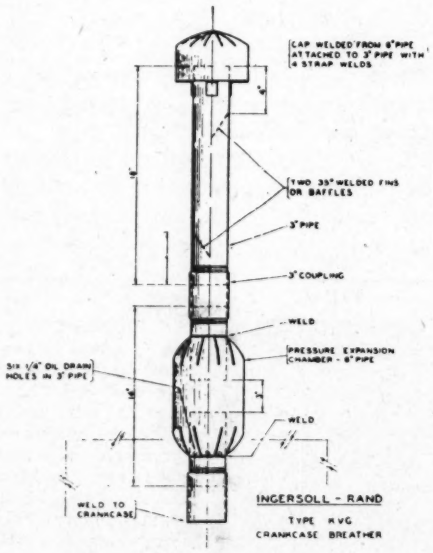
2. Using a rubber grommet on the pipe into the ground to seal the area to be cleared, from the atmosphere.

3. An adapter to fit pneumatic couplings.

Breather

CHARLES J. WITT, chief engineer, Tuscola compressor station, Panhandle Eastern Pipe Line Co.

Breathers were installed on each of the Ingersoll-Rand KVG engines at Panhandle Eastern's Sneed compressor station at the suggestion of Mr. Witt, who was then assistant chief


CAP WELDED FROM 8" PIPE ATTACHED TO 3" PIPE WITH 4 STRAP WELDS
TWO 35" WELDED FINS ON BAFFLES
3" PIPE
3" COUPLING
WELD
PRESSURE EXPANSION CHAMBER - 8" PIPE
SIX 1/4" OIL DRAIN HOLES IN 3" PIPE
WELD
WELD TO CRANKCASE
INGERSOLL - RAND
TYPE KVG
CRANKCASE BREATHER

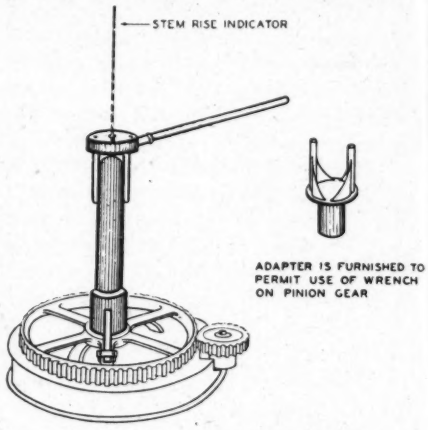
engineer at the station. He received a $15.00 award for the idea.

Two breathers were installed on each engine, one to each crank case top plate, as shown in the drawing. Their purpose is to relieve crank case pressure. They also prevent oil from being sprayed over the engine and floor. This constitutes a saving in oil, and may prevent accidents caused by slippery floors.

Gate Wrench

J. J. TIPTON, pipeline division superintendent at Paola for Panhandle Eastern Pipe Line Co. devised this finger-saving gate wrench, winning a prize of $25.

THIS finger-saving gate wrench has been put to use in the Paola division of Panhandle Eastern Pipe Line Co. The wrench helps save time in the opening and closing of main line gates, cuts down on the number of



men required, and prevents accidents by eliminating the necessity of anyone having his hands near the gate wheels.

The wrench is the simple ratchet type. The installation is quite easy, and only one wrench is required. The bracket for operating is made of one in. pipe, welded on each side of the stem protector. An indicator is used, so that the operator will know the position of the disc in the gate.

WPB Grants Steel For Distribution Rehabilitation

Given priority by WPB to secure the necessary steel, the distribution department of the Southern California Gas Co. last month prepared to go ahead with the first new pipeline construction program of any magnitude undertaken since the war started.

Distribution manager Elting Henderson said that WPB's approval has been given for the installation of around 2860 tons of steel for pipelines, and that some $740,000 in much needed additions and betterments to the distribution system will be completed before next winter.

Columbia Gas To Dispose Of Electric Properties

The management of Columbia Gas and Electric Corp. and its statutory parent, United Corp. last month were attempting to iron out differences as to policy in the matter of Columbia's compliance with the SEC's geographical integration and corporate simplification order of May 2. Both interests have agreed on the elimination of the electric properties and the integration of Columbia as a gas system, although the methods by which the electric properties would be disposed of are still in controversy.

REPEAT ORDERS tell the Story

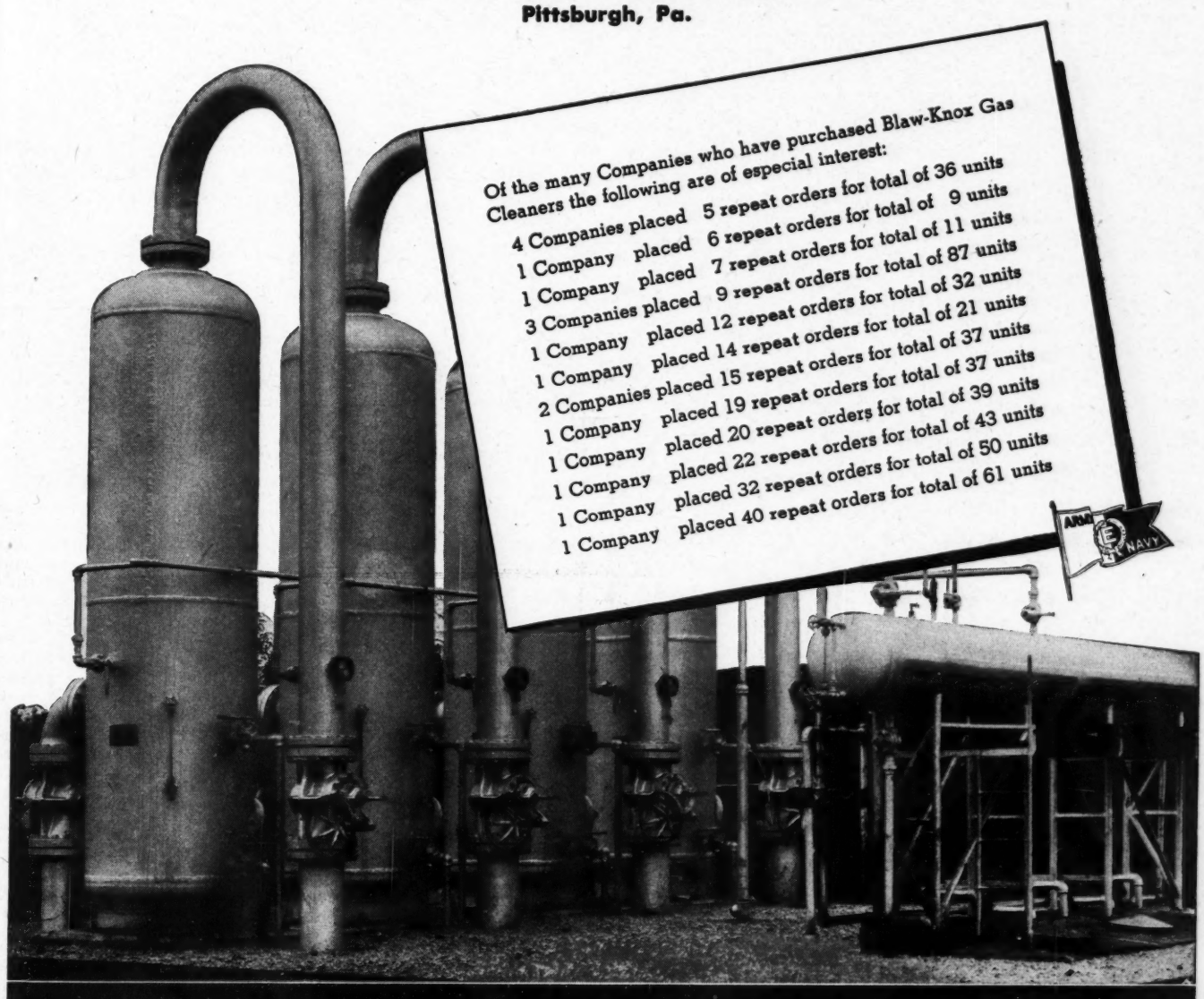
Repeat orders prove the value of Blaw-Knox Gas Cleaners. Original installations prove so successful that gas companies equip other stations as quickly as they can.

What the purchasers of Blaw-Knox Gas Cleaners think of their performance is clearly indicated by the number of repeat orders that follow initial installations. Write us today for complete illustrated data.

Gas companies buy Blaw-Knox Gas Cleaners again and again because they—

- Protect fine compressor station equipment
- Assure "availability" of compressors during peak loads
- Reduce customer complaints and service calls
- Lower pump station upkeep and transportation costs
- Help maintain better public relations

BLAW-KNOX DIVISION OF BLAW-KNOX COMPANY
2033 Farmers Bank Building
Pittsburgh, Pa.


Of the many Companies who have purchased Blaw-Knox Gas Cleaners the following are of especial interest:
4 Companies placed 5 repeat orders for total of 36 units
1 Company placed 6 repeat orders for total of 9 units
1 Company placed 7 repeat orders for total of 11 units
3 Companies placed 9 repeat orders for total of 87 units
1 Company placed 12 repeat orders for total of 32 units
1 Company placed 14 repeat orders for total of 21 units
2 Companies placed 15 repeat orders for total of 37 units
1 Company placed 19 repeat orders for total of 37 units
1 Company placed 20 repeat orders for total of 39 units
1 Company placed 22 repeat orders for total of 43 units
1 Company placed 32 repeat orders for total of 50 units
1 Company placed 40 repeat orders for total of 61 units
ARMY
NAVY

BLAW-KNOX GAS CLEANERS

The Servel Air Conditioner --- How It Works

AIR conditioning as a major industry has been in the process of development for many years, and during that period its use in commercial establishments such as department stores and theatres has given the general public a real desire to incorporate such improvements in their own homes.

This desire for better health and comfort in the home through controlled indoor climate naturally suggests the demand for equipment which has been specificially designed for residential application. Air conditioning equipment, in order to satisfy this growing demand, should be capable of functioning as an all-year system—yet it should be so simple to operate that any housewife can manage the unit as easily as she operates a radio.

In addition, this residential air conditioner should offer the features of quiet, carefree performance, flexibility of operation, reasonable initial cost, low cost of operation, long life, and simplicity of design.

Well acquainted with these requirements, engineers of Servel Inc., Evansville, Ind., have developed the All-Year Gas Air Conditioner. With proven performance, it heats, humidifies, cleans and circulates air in winter; while it cools, dehumidifies, cleans and circulates air in the summer. Winter heating and summer cooling are accomplished by a single self-contained gas-fired unit.

Winter Heating

The job of winter home heating is accomplished by means of an "indirect" type system whereby a compact steam generator is built into the conditioner and delivers steam to a heating coil located directly above. The air to be heated is drawn through the steam heating coil and then delivered by the fan to the space being conditioned.

The steam generator operates at atmospheric pressure. For this reason, together with the fact that the volume of water in the generator is small, steam is generated very quickly and is delivered to the heating coil, where it becomes immediately effective in heating the air stream. Quick generation of steam in the steam generator makes the Servel indirect system responsive in performance and prevents a lag between the room temperature and the thermostat setting.

When the thermostat becomes completely satisfied, the burners automatically shut off, and the generator immediately ceases to produce steam. The absence of pressure in the steam circuits and the compactness of the unit results in the system having very little steam storage capacity or residual heat.

Forced air circulation for heating permits accurate and uniform balancing of room temperatures. The very small residual heat which is stored up in the heating coil makes impossible any gravity action of the unit after the blower has stopped. Consequently, the balance and uniformity of the forced air system is not destroyed. This arrangement further eliminates the possibility of "overshoot" in temperatures after the thermostat is satisfied.

Modulated heating capacity is made available by step control. The action of the Selectrol, the thermostatic control, permits the gas burners to operate at full or partial input, depending upon the changes in room temperature. The flow of heat is prolonged by reducing capacity as the load lessens thereby maintaining more uniform conditions.

Variable heating capacity is a definite feature in terms of producing maximum comfort within the conditioned space. The system is one that will readily adapt itself to changing weather conditions.

Ample humidification capacity is provided by a pan type humidifier which receives heat directly from the steam circuit as an aid to more effective evaporation of the water.

It is interesting to note that in both the heating cycle and the refrigeration cycle, the gas burners, steam generator, air filters, Selectrol, and diverter valve are principal parts common to both systems.

The Refrigeration Cycle

During the summer months refrigeration is produced by the "absorption" principle which utilizes heat as a motivating force for the refrigeration cycle.

The entire system operates under a vacuum at all times. The absolute pressure within the generator and condenser, however, is somewhat higher than in the evaporator and absorber.

The system is charged with a salt solution and water. The water is the refrigerating medium and the salt solution is the absorbent.

Simplicity of operation and control are the fundamental features which this type of system embodies. There are no moving parts within the refrigeration cycle and, therefore, long

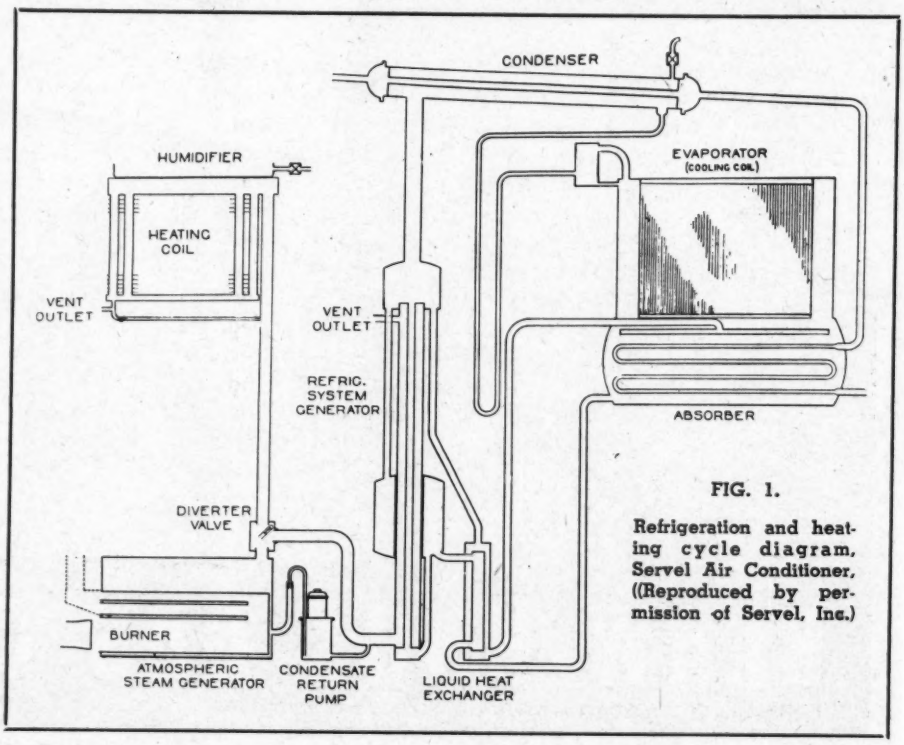
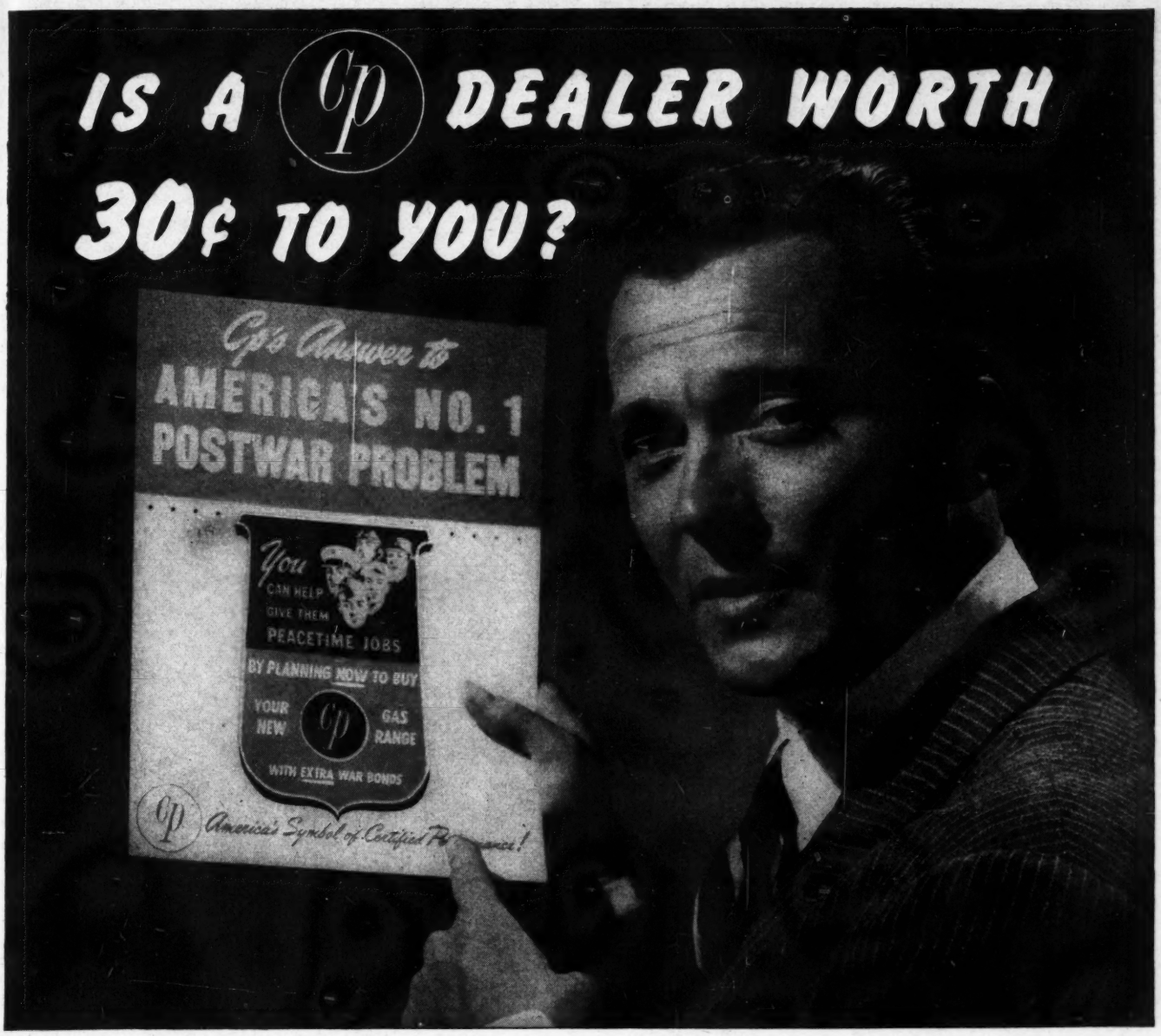


FIG. 1.

Refrigeration and heating cycle diagram, Servel Air Conditioner, ((Reproduced by permission of Servel, Inc.)



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Use the CP Business Building Plan yourself and pre-sell customers on gas for cooking and CP for Certified Performance. Mail the CP Business Building Plan Kit to every one of your dealers. It costs you only 30¢ a Kit and will help you build strong dealer cooperation and increased sales of CP Gas Ranges in the postwar era.

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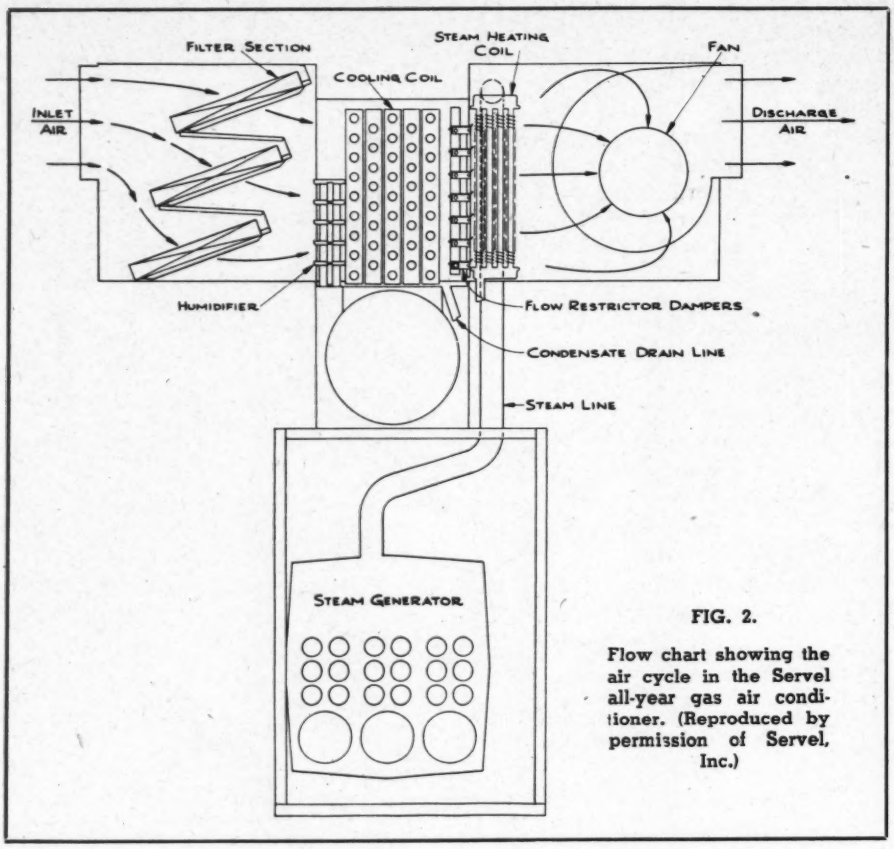


FIG. 2.

Flow chart showing the air cycle in the Servel all-year gas air conditioner. (Reproduced by permission of Servel, Inc.)

life is assured with uniformly high efficiency at all times.

Dehumidification is accomplished by passing the air stream over the refrigerated coil surface which is sufficiently cold to extract moisture simultaneously with dry bulb cooling. Surface dehumidification offers positive moisture extraction in balanced relationship with cooling capacity.

Modulated refrigeration capacity is available by step control. The action of the thermostatic control, known as the Selectrol, permits the gas burners to operate at full capacity or partial capacity, and thereby the heat input to the refrigeration unit becomes a variable to best suit conditions. This arrangement permits the refrigeration unit to operate more continuously during mild weather and to provide more uniform comfort conditions.

The Servel induced draft cooling towers, which recirculate and cool condensing water, were developed as companion pieces to the All-Year air conditioners. Two in number, they respectively meet the capacity requirements of the three and five-ton refrigeration units. Water is cooled by evaporation, and only that small quantity lost in the process is required for make-up.

They embody the features of compactness, quiet operation, reasonable first cost, and low operating cost.

Designed for indoor or outdoor use, they meet all requirements in localities where the use of city or well water for condensing purposes is impractical.

Air Circuit

The following will explain the air circuit through the Servel "All-Year" conditioners.

The inlet air to the conditioner enters a plenum chamber which contains a filter section. The air travel within the unit is first through the filter section which efficiently cleans the air by removing the entrained dust and dirt in the filter media. A large filter area has been provided which results in a relatively low air velocity producing the desired high cleaning efficiency.

The air leaving the filter section passes through a humidifier which functions during the heating cycle. The humidifier consists of a number of horizontal trays, each equipped with an overflow tube which feeds water to the next lower tray. This arrangement provides a large evaporative surface for positive humidification. Hot water is supplied, in the proper quantities, to the humidifier trays; the source of heat for this water is by heat exchange action with the steam line which supplied the heating coil.

The air then passes through the cooling coil and, during the summer cycle, heat is extracted from the air and moisture is condensed onto the refrigerated coil surface, both functions being performed to the proper degree.

During the winter cycle, the air is heated by the steam heating coil which is placed in the air circuit following the cooling coil.

Thus the fan is so positioned that air is drawn through the cooling and heating coils in series and is then delivered to the duct system through which the air is distributed to the various rooms being conditioned.

Since less air is normally required for winter heating than for summer cooling, a "Flow Restrictor" is incorporated into the air circuit between the cooling coil and heating coil, which functions to automatically reduce the flow of air during the heating cycle. The flow restrictor is a multi-blade damper section, actuated by a damper motor that operates the "steam diverter valve" through which steam is directed to the heating or cooling cycles. The action is such that when the conditioner is operating on the heating cycle the restrictor dampers will have been caused to partially close automatically resulting in a lowering of the delivered air quantity.

Control

Complete control of the Servel "All-Year" Air Conditioner is centered in the Selectrol which is a combination of a thermostat and manually operated switches. The Selectrol provides a modulated two-step automatic control which insures the proper heating or cooling capacity for varying conditions. It provides full capacity for peak demands of heating or cooling and partial capacity for moderate heating or cooling requirements.

When it is desired to change the operation of the conditioner from the heating cycle to the cooling cycle or vice versa the user resets the control switches on the Selectrol which is located at a convenient position in the space to be conditioned. A separate switch is provided for independent operation of the conditioner fan to provide air circulation during seasons when cooling or heating is not required.

When the Selectrol switches are reset, a two-position steam diverter valve automatically directs the flow of steam from the atmospheric steam generator to either the heating coil or to the refrigeration generator.

Performance Data

Just knowing the operating characteristics of a unit isn't enough. What has been the experience of the Servel All-Year Air Conditioners in the field? What are its load possibilities for the gas industry?

In order to determine the characteristics of this load and to help evaluate its future possibilities in the New Jersey climate, Public Service Electric and Gas Co. installed a year 'round air conditioning unit in the home of Mr. and Mrs. D. C. Hungerford at Madison, N. J. The unit was installed under an arrangement with the customer whereby the utility company was allowed to collect data throughout the summer of 1942.

The house has nine rooms, four baths, and spacious halls. There are two people and a maid in the household.

The house was under construction during the spring of 1942. Unfortunately the duct system was in place before the decision was made to install the year 'round unit. This fact restricted the layout to some degree. The most important changes called for an enlarged plenum chamber and the extension of the supply risers on the first floor so that high air supply could be used during the cooling season and low supply during the heating season.

The unit selected was the 5-ton Servel conditioner. Because of the absence of a city sewer and also because of the high water cost, the unit was installed with a cooling tower. The cost of the installation was $1-924.34, which included the air conditioning unit; the cooling tower: setting up the equipment; special grilles and sheet metal changes: plumbing and carpentry work; and miscellaneous items.

The customers moved into the house during the week of June 1. They started to collect data for the week of June 8. During the first week of the test, carpenters and mechanics were putting on the finishing touches to the house with the result that doors and windows were often left open so that the data collected during this short period is not reliable. The test ended on September 18 which was the last date cooling was required.

If the owners had operated the system in the usual way by changing the thermostat whenever they desired, it would have been more difficult to interpret the accomplishments. The utility company, therefore, requested that the thermostat be left at 74° unless extremely high outdoor temperatures made this undesirable. As a result they have a definite measure of the work the equipment was called upon to do and what it actually accomplished.

A standard weather bureau station was set up for continuous recording of outdoor temperatures and relative humidities. Similar instruments were set up in the study on the first floor. By comparing the recording charts of these two instruments we could demonstrate what the air conditioner was accomplishing each hour of the day and night.

Instruments were installed to measure the number of hours the unit was in operation during the day and during the night. This was still further broken down into full or partial capacity operation (high and low gas input).

The temperature, humidity, and weather data for every day during the summer were recorded.

The air conditioner and cooling tower operated for a total of 714.8 hours. The day (6 a.m. to 6 p.m.) and night (6 p.m. to 6 a.m.) periods of operation were nearly equal. The day hours were 400.4 and the night hours were 314.4.

An interesting angle of this part of the test was the amount of total dehumidification accomplished. All water removed by the unit was collected and measured. It amounted to the considerable total of 616.5 gals. for the season. The highest week was from July 27 to August 2, when 123.0 gals. were removed. The utility company believes this is the first time such information has been collected and from the user interest standpoint it turned out to be the result that seemed to make the greatest impression.

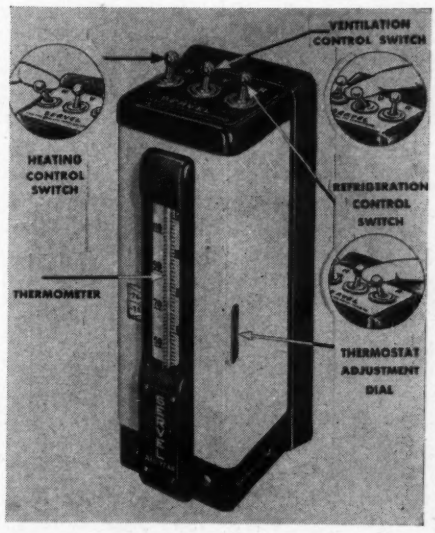


FIG. 3. Selectrol

A gas meter was installed and the weekly consumption was recorded. The total cubic feet of gas used for the cooling season was 87,370 cu. ft. of 525 Btu gas. Daily readings were also taken on the gas meter during July and August to determine the maximum daily use. The maximum day occurred on Monday, July 20, and was 3700 cu. ft. The ratio of the maximum day to the total summer consumption was 1/24.

Electric meters were installed to measure separately the conditioner use and the cooling tower use of electricity. The total KWH used was 1041.9 which was divided as follows: Air conditioner 430.2 KWH, cooling tower 611.7 KWH.

If the cooling tower had not been used the electric cost would have been considerably less, but the water cost would have been proportionately higher.

Servicing and Costs

The unit was remarkably free from service troubles. It maintained a very comfortable temperature and humidity condition throughout the house including the maid's quarters and kitchen. Of course, during hours when the gas range was in use the kitchen exhaust fan was usually operated to carry off the heat gain from this source. The unit had no trouble in maintaining satisfactory temperature reduction even in the warmest weather. The hottest day was on July 19 when the outdoor temperature reached 96°. That day the unit operated approximately 24 hours and the maximum temperature reduction was 20°. This large temperature reduction is not looked upon as good general practice but does show that the unit had ample capacity.

The air at all times had a freshness that was stimulating. At no time were any of the odors present that are sometimes associated with cooling systems.

Following is a list of the utility services used and the cost of these services to the customer for the cooling season:

Gas—	
87,370 cu. ft. at 51c per MCF.....	$44.52
Electric—	
Conditioner	
430.2 KWH at 4½c = $19.09	
Cooling Tower	
611.7 KWH at 4½ = $27.79	
1041.9 KWH.....	46.88
Water—	
16.542 gals. at 22½c per thousand gals.	3.74
	$95.14

This is an average of 13.3c per running hour of the unit. The period

over which the unit operated (including the week it was out of use) was 95 days. The operating cost averaged therefore almost exactly $1.00 per day for the whole summer season.

The small cost for water ($3.74) is, of course, due to the use of the cooling tower. Under this method the water is used over and over and only a small amount of make-up water is needed to replace that lost in the evaporative cooling of the condenser water.

Customer Reaction

The atmospheric conditions produced seemed to be very acceptable to the users. However, the users did feel that they would have been satisfied with less hours of operation. To put it another way they would have turned the unit off and opened the windows on certain dry cool days and nights and they would probably have been satisfied with less temperature differential during very hot weather. They willingly cooperated, however, for purposes of the test to carry a level 74° so that we could have a definite datum plane from which to measure the accomplishments of the unit.

The utility company has proved to itself that there is equipment on the market which functions satisfactorily and with minimum service troubles. They believe the operating costs from the customer viewpoint can be considered reasonable.

And that is the story of the Servel unit and one example out of 358 installations of how it has performed in the field to date. In general it may be said that the experience of the manufacturer, utility, and consumer indicate that the quality of the installation including all details of design and workmanship of the duct system has a great deal to do with the success of the installation and the satisfaction of the consumer. The Indoor Climate Institute have set this point forth as one of their main objectives for cultivation on the part of demand by the consumer and specification by the manufacturer and utility.

Present public interest in air conditioning as a postwar project and by the utility companies indicates a great future for Servel All-Year Gas Air Conditioning.

Radiant Heating Installations Reach 1000 Mark

RADIANT heating, which some architects and engineers affirm will be one of the three or four revolutionary new ideas to be accepted generally by the building industry after the war, had achieved by June 1 nearly a thousand recorded installations in this country, according to L. F. Rains, president of the A. M. Byers Co., Pittsburgh, wrought iron manufacturers, who have pioneered development of the system.

The system is ready for widespread adoption in postwar homes, Mr. Rains says, because essential research has been completed and sufficient case studies have been made to assure results.

Chief advantages of radiant heating, according to Mr. Rains, are the improved comfort it provides, greater cleanliness, complete concealment which permits full use of floor areas, reduction of air currents, and fuel economy ranging up to 30% compared with other systems.

To demonstrate in simple manner how the system functions, the company is equipping its staff of field service engineers with miniature displays like the above. Sally Kaufman, of the company's engineering service department, is shown here with the first of the new models, duplicates of which are being forwarded to the company's division offices as fast as they are completed.

The house, hinged at the back, can be raised to reveal transparent flooring in which is embedded illuminated tubing. This tubing simulates the wrought iron pipe coils through which, in actual installations, hot water is circulated to convert the entire floor into a heat radiating surface.

AWARDS

• A second renewal of the Army-Navy "E" award for meritorious service on the production front has been awarded to the **Tappan Stove Co.**, Mansfield, O., it was announced last month by the navy department in a letter to P. R. Tappan, president. Tappan Stove thus becomes the first major industrial plant in Mansfield to rate the second coveted renewal.

• Both the **Minneapolis Gas Light Co.** and the **Northern States Power Co.** received National Security Awards May 19 in a joint ceremony presided over by Major Gen. Clarence H. Danielson, commanding general of the Seventh Service Command in Omaha, at which Governor Edward J. Thye was principal speaker.

The awards were accepted by **H. K. Wrench** of the Minneapolis Gas Light Co., and **T. D. Crocker** of Northern States Power Co.

• **Payne Furnace & Supply Co., Inc.**, Beverly Hills, Calif., in peacetime one of America's largest manufacturers of heating equipment, has won, for the second time, the Army-Navy Award for meritorious services on the production front and the right to add the "White Star" to its "E" flag, according to notification just received from Under-Secretary of War Patterson by E. L. Payne, president of the company.

• To **Public Service Co. of Northern Illinois**, for outstanding achievement in safeguarding its vital wartime gas and electric services, the National Security Award. The award was presented to Britton I. Budd, president of the company, by the sixth civilian defense region of the OCD on June 28.

The company serves gas and electricity to a thousand war plants, 20,000 farms, and 350 communities in northern Illinois.

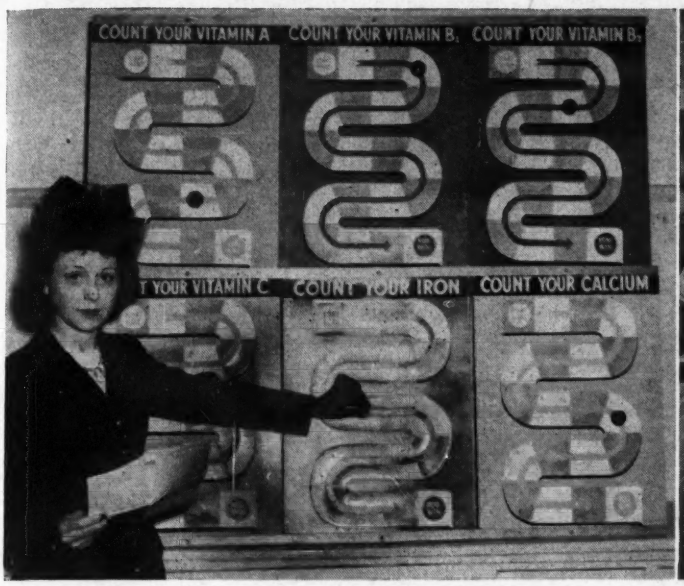
• For "excellence in the production of war materiel" **Quick Meal Division** of **American Stove Co.**, St. Louis, Mo., has been awarded the Army-Navy "E" Pennant.

The firm was praised for speed and versatility in switching from the peacetime production of gas ranges to that of high explosive shells, heavy demolition bombs, small fragmentation bombs, auxiliary gas tanks for airplanes and parachute flares.

This award was one of four received almost simultaneously by American Stove Co. The other three included the U. S. Treasury "Minute Man" Flag, awarded to The Aircraft Division, Cleveland; The National Security Emblem to The Quick Meal Division; and a letter of commendation from General Arnold.

FPC Orders New Rate Schedule

The Federal Power Commission announced June 29 its order allowing new rate schedules filed by the **Interstate Natural Gas Co.**, Inc. and United Gas Pipe Line Co., which on the basis of 1943 sales result in a reduction of $674,853 to New Orleans distributors, to become effective on all bills rendered on or after June 15, 1943.



Miss Luella Osborn (at left), home economist for the San Francisco division of Pacific Gas and Electric Co. demonstrates the Vita-Min-Go game before a home economics class of San Francisco high school girls.

Culinary Debs of the West

By LUELLA E. OSBORN
Home Economist,
San Francisco Division,
Pacific Gas and Electric Company

WHO said, "The girls of today will be the homemakers of tomorrow?" Those girls *are* the homemakers of today! We are referring to the members of the Girl Scout Troops, the students in junior and senior high schools, the Camp Fire Girls and other youth organizations.

As more and more mothers take up positions in defense and war work, their daughters of high school age shoulder the responsibilities of the shopping and storing of food and the planning, preparing and serving of nutritious meals.

We have realized that no normal girl of teen age truly grasps the meaning of nutrition and the chemistry of food and we can't blame her. Life is too full of more normal interests, such as the latest shade of nail polish or the newest fads in dress.

But, just you start something that is fun and you're a Pied Piper. The Vita-Min-Go game is one of those tricks. A large 16x14 in. reproduction of each of the six cards for the vitamins and minerals used in this game is placed in a large frame supported by an easel back. A short introduction on nutrition and its influence on beauty, personality and popularity gains the attention and interest of the members; then a student is selected at random from the audience, and as she relates her daily diet, the food values are charted. Each vitamin and mineral is discussed as to its contribution toward a lovely skin, dancing eyes, glistening hair, strong fingernails, straight beautiful legs, dazzling white teeth and a magnetic smile. The girls literally eat it up!

We have been informed that this game's influence doesn't terminate at the conclusion of this presentation, either, for many a tough man has decided to eat spinach after he has seen its nutritive value charted by the Young Fry in his family.

When it comes to planning meals, the girls enthusiastically participate in a project with the use of visual aids. The colored food models from the National Dairy Council are backed with a small square of outing flannel and the girls take turns selecting one food and placing it on a large piece of outing flannel stretched tight over a large framework. The texture of the two pieces of flannel makes the models cling in place as the foods are arranged in groups comprising breakfast, lunch and dinner. The lively debates and criticisms resulting from this lesson do more to instill the basic fundamentals of adequate diets than any number of other impersonal lectures on well balanced meals. The "Basic 7" chart is used as the guide to good eating and during this demonstration the proper methods of vegetable and meat cookery are discussed, and emphasis is also placed on the conservation of fuel, time, energy, and food values.

Kitchen Klinics are fun, too. These classes are held in the group's club rooms, the Red Cross Centers, or in a School Home Economics laboratory where favorite, as well as unusual recipes from all parts of the world are collected and tried out. A true appreciation and understanding of the variety and wealth of American foodstuffs develop very quickly.

Another activity that always has a long waiting list is the field trips to wholesale and retail markets, and to commercial and institutional kitchens. On these tours the girls respond very quickly to questions and discussions on how to recognize meat cuts, how to select fruits and vegetables for greatest nutritive values, and which purchases would be the wisest food expenditures. Information about unusual foods on the market also gives the director a chance to incorporate additional information on other foods and their method of preparation.

A less popular, but interesting lesson that stimulates spontaneous remarks and question is the one we give on the subject of frozen and dehydrated foods.

So, we feel that the success of our work with the young people of the west coast lies in the fact that we have presented the nutrition story in a way that is not only entertaining, but educational, too. In this way we have helped these Culinary Debs of the West to do the job of feeding our people so well that we shall be victorious in our battles on the Home Front as well as on the Front Lines.

Post-war NOTES and NOTIONS

By STANLEY JENKS

Hotel News

The American Hotel Association has made a survey among its members of the *immediate* (not postwar) needs for equipment and furnishings of its members. The post-war survey will be made later. The information was compiled for submission to the proper governmental authorities for relief.

The following figures interest us:

Ranges	3,612	Ovens	1,113
Toasters	4,725	Coffee urns	4,200
Ironers	819	Presses	798

Refrigerator requirements are expressed in dollars and cents.

New refrigerators	$2,253,300
New boxes	1,650,600

All of which indicates as much as we want to make out of it locally when the commercial load becomes more important.

Industry Education

In a previous issue, the question of self-analysis was brought up, with a view that by looking ourselves over very thoroughly, we oldsters might be able to steer our youngsters along a better path. A good question is whether we in our own particular job are too self-contained? Let me elucidate, as poor old Bert Williams used to say. In the army they call it morale or *esprit de corps.* It's the inward lift a fellow gets from doing his job. Do our salesmen, for example, know enough about the general workings of their company to have the confidence to be proud of it? This can only come from knowledge of what is going on. Other departments should be invited to tell what they do and how they do it. It makes for better teamwork. Also, if stimulating knowledge of the gas industry is a worthwhile goal, there is no readier way to achieve this than by encouraging employes to study and discuss the advertisements in trade publications like GAS. The advertisements in themselves are an education in modern gas practice.

The Job Ahead

In his paper "The Job Ahead" presented before the Pacific Coast Gas Association's Gas Industry Development Conference in April, and published in the June issue of GAS, N. Henry Gellert, president, Seattle Gas Co. said plenty which has needed to be said to our industry leaders for some time. Mr. Gellert's remarks should sizzle some of our executives out of their too apparent inertia in the face of the intensive forthcoming battle of the fuels.

The immediate threat is aimed primarily at the manufactured gas branch of our industry because it is far more vulnerable at this time. Why? The answer is relatively simple.

Our costs of production are too high. We can talk until we are blue in the face about the comfort, controllability and convenience factors of gaseous fuels, but there is a cost of service factor to be faced too. New and cheaper ways of making gas must be found. The engineers and chemists must be hired to take the handcuffs off our promotional men if the latter are to make our postwar promotional plans click. When you stumble into holder costs as high as 67¢ per Mcf, as I did recently, and which is admittedly exceptional, you know that there is considerable room for improvement. The fact that such a condition has been allowed to exist, and that there are hundreds of situations only slightly better, makes you wonder if our managements are simply apathetic to the realities of the future, or whether they are just purposely whistling "The old grey mare ain't what she used to be" and are content to let this self-same O. G. mare do the best she can until she collapses in her traces, with the hopes that by demise day she might have paid for herself.

It is no new thought that the gas industry is essentially a chemical industry. The British and Germans have conclusively demonstrated that. Yet, as Mr. Gellert points out, we are dealing with coal and oil and know practically little about them. In Britain they have reduced their holder costs to a few pennies in some instances through the development of commercial by-products. Mr. Gellert suggests high-grade resins, plastics, plasticising oils and what not.

Readers of this page know by now that I am neither a defeatist nor despairer. I believe in the future of the gas industry. The problem facing the manufactured gas industry is certainly not beyond solution. But it must be tackled now while the industry is still a going concern and before the barnacles get too thick.

New Appliances

I cannot subscribe *in toto* to the frenzied clamor from some quarters that our pre-war appliances were hopelessly inadequate, and therefore by inference—painfully uneconomic. If they were, however, their deficiencies should be blamed primarily on the utility utilization and merchandising men rather than on the manufacturers. The utility men through the AGA Laboratory (minimum standards are by no means an unmixed blessing) and through their own whims and prejudices, called the tune because they paid the piper. The manufacturers in a highly competitive field had no choice but to fill the bill, mainly to utility price specifications. Utility cravings for merchandising profits never made possible a General Electric or Westinghouse Co. so that adequate development and research could be undertaken by manufacturers. It was extremely penny wise and pound foolish in the light of what is ahead.

Our manufacturers have done a magnificient job with the resources permitted them, and it is to be hoped that one and every gas utility in the United States will take very much to heart recommendation No. 20 of the AGA Post War Planning Committee which reads "Encouragement should be given manufacturers to advertise and carry on research."

By "encouragement" I assume the committee means "adequate profit."

An Example of P·G and E's current GAS advertising appearing in 309 northern and central California newspapers

OUR THEME THIS MONTH

**Conservation of Gas & Care of Equipment*

Food fights for freedom!
DON'T WASTE A MORSEL!

USE IT UP!

EAT IT UP!

Take Care of YOUR RANGE

save food... save fuel

Today... never say, "Oh, that's not enough to save." Use every spoonful of leftovers especially if they are beef, lamb or pork. Grind up meat scrap...hash it, cake it or loaf it. Pep it up as a Mexican dish with chili or go Chinese with soy sauce and onions. Leftovers are so easily turned into appetizing nourishing meals. Saving food IS important! Did you know that American families have been throwing away enough food each year to feed ALL our armies overseas? It's the truth. There is just one other important saving too. Save the life and the cooking efficiency of your range by keeping it clean and in good repair. The best way to do this is to "service it up" after every meal. It will look better to you and it will cook better for you.

Have your Pressure Cooker tested before the canning season. Ask about this wartime service at your local P. G. and E. office. No charge, no obligation.

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY GE24W-644

FUEL fights for freedom!
Conserve Gas and Electricity!

ASSOCIATIONS

Measurement Course Draws 500 Attendants

WAR-TIME difficulties did not prevent 500 representatives of the gas and related industries from 25 states and Canada, from attending the 1944 Southwestern Gas Measurement Short Course, held in the Engineering building, University of Oklahoma, Norman, June 6, 7 and 8. Attendance exceeded expectations of the general committee, Kate A. Niblack, chairman of registration committee and member of the general committee, stated. In addition to the gas company registrants, were 45 students of the College of Engineering, most of them service men taking special training. Several women employees of gas companies also enrolled in the course.

W. H. Carson, dean of the College of Engineering, chairman of the executive committee, explained that resumption of the short course this year, after temporary suspension last year because of war-time transportation difficulties, was in response to an insistent popular demand. Many company employees attended for the first time.

Max K. Watson, Canadian River Gas Co., Amarillo, Texas, general chairman since 1942, presided over all general sessions. He was succeeded by Earl Kightlinger, superintendent of gas measurement, Arkansas Louisiana Gas Co., Shreveport, La., who has been active in the short course for the past 10 years and has held chairmanships of several important committees.

The gas industry has proved its ability to meet the greatest demands for its products in history and to make necessary pipeline and plant expansions in spite of war-time difficulties, R. E. Wertz, president, Amarillo Gas Co., Amarillo, Texas, told school attendants. He predicted a bright postwar future for the industry if it is as keen to meet competition of other fuels as it has been to take care of needs of war and essential industries, in addition to maintaining service to commercial and domestic consumers.

The committee for study of practical methods, chairman E. C. McAninch, Oklahoma Natural Gas Co., Tulsa, reported that it is now studying several subjects, data on which will be completed before the 1945 short course session. These include "Compressibility Factors," "Pipe Line and Weld Heaters," and "Safety Suggestions in Handling Gas."

Other general session speakers included: Dr. G. L. Cross, acting president, University of Oklahoma, "Address of Welcome"; E. F. Dawson, of the University faculty, on "Fundamental Gas Laws"; Blanchard Smith, the Chaplin-Fulton Manufacturing Co., Pittsburgh, Pa., "Fundamental Principles of Regulators"; A. F. Benson, American Meter Co., Erie, Pa., "Fundamental Principles of Orifice Meters" and C. C. Abbott, Pittsburgh Equitable Meter Co., Pittsburgh, "Fundamental Principles of Displacement Meters."

Two "wrinkles" classes, conducted by Pat H. Miller, Panhandle Eastern Pipe Line Co., Kansas City, Mo., who is chairman of the Wrinkles Committee, proved to be popular.

Winners of prizes for best papers written on what the writer learned at the 1942 short course, were announced as follows: First prize, $15, G. L. Bubb, Ladel Oil Properties, Inc., Monroe, La.; Second prize, $10, C. H. Rhodes, Southern Carbon Co., Fairbanks, La.; Five third prizes, $5 each, R. F. Downey, Lone Star Gas Co., Dallas, Texas; Joe Harris, United Gas Pipe Line Co., San Antonio, Texas; S. E. Sentell, Jr., Arkansas Louisiana Gas Co., Shreveport, La.; H. A. Thompson, Mineral Wells, Texas and H. P. Pringle, The Shamrock Oil & Gas Corp., Sunray, Texas.

About 20 manufacturers of gas equipment had exhibits at the school. Several of them furnished instructors for more than 50 afternoon classes held during the school.

Assisting the College Engineering in sponsoring the short course were: The Corporation Commissions of Oklahoma and Kansas, The Railroad Commission of Texas, the Arkansas Oil and Gas Commission, the Oklahoma Utilities Association, Natural Gas Section, A.G.A., represented at the school by Kerwin R. Boyes, New York City and Natural Gasoline Association of America, Tulsa, Okla., represented by W. F. Lowe, secretary.

John H. Baxter, gas consultant, Bartlesville, Okla., chairman of the Southwestern Gas Measurement Short course from its beginning in 1924 to 1926, inclusive, attended the 1944 session of the school and was introduced. The school was opened in 1924 with an enrollment of 60, and until it outgrew Oklahoma, it was known as the Oklahoma Gas Meter School. It is now one among three gas measurement courses in the United States.

At the Southwestern Gas Measurement Short Course, Max K. Watson, retiring general chairman (second from left), passing gavel to his successor, Earl Kightlinger. College of Engineering Dean W. H. Carson, chairman of the executive committee, at extreme left and Miss Kate A. Niblack, chairman of the registration committee.

H. Vinton Potter Will Head Coordinated Kitchen Program

H. VINTON POTTER, general sales manager, Fall River Gas Works Co., Fall River, Mass., joined the American Gas Association July 1 as coordinator of the efforts of the manufacturers and utilities in developing the Coordinated Gas Kitchen Program sponsored by the Association's Postwar Planning Committee.

H. V. Potter

In his new affiliation Mr. Potter succeeds C. V. Sorenson, chairman of the Association's Residential Gas Section, who since February has devoted his time to promoting interest throughout the gas industry in the coordinated gas kitchen program.

A special committee under the chairmanship of John H. Warden, vice chairman of the Residential Gas Section and sales manager of the Oklahoma Natural Gas Co., Tulsa, Okla., has charge of the promotional aspects of this program.

A graduate of Brown University, Mr. Potter joined the Blackstone Valley Gas & Electric Co. as salesman in 1926, and advanced to the position of merchandise manager. He resigned from the company in 1937 to go to the Oklahoma Natural Gas Co. where he served as merchandise and advertising manager, coordinating dealer activities in concerted sales drives and supervising the company's institutional advertising.

In 1940 he joined the Fall River Gas Works Co. in his present capacity as general sales manager. Mr. Potter has been active in gas association committee work. He has been a member of the AGA Refrigeration and Water Heating Committees as well as New England regional director of the Certified Performance range campaign. This year he was elected chairman of the sales division of the New England Gas Association.

Canadian Meeting

STUDIES being made by the Postwar Planning Committee of the American Gas Association were outlined at the 37th annual meeting of the Canadian Gas Association, held in Hamilton, Ontario, on June 8 at the Royal Connaught Hotel, by A. M. Beebee, general superintendent of the Rochester Gas & Electric Corp., and chairman of the AGA committee. (GAS, June, 1944, p. 18).

The CGA Postwar Planning Committee general report came before the meeting and discussion was held. In its report, the sub-committee on "Engineering and Economic Aspects of our own ability to satisfy the Potential Market," headed by H. W. Durgy, division superintendent, Dominion Natural Gas Co., Ltd., St. Catharines, Ontario, stressed that the gas industry in Canada has not advertised to the extent that its needs require nor in the quality desirable.

The committee, recommended also that gas equipment manufacturers as well as gas companies combine their efforts in advertising the advantages of gas, and that the Canadian gas industry support the national advertising of AGA, as enough American periodicals reach Canada to make this worthwhile.

Alan H. Harris, Jr., manager, Gas Utility, Winnipeg Electric Co., Winnipeg, Manitoba, the incoming president of the CGA, acted as chairman at the meeting. Retiring president, Frank D. Howell, division superintendent, Dominion Natural Gas Co., Ltd. Brantford, Ontario, was absent due to illness in his family.

In addition to Harris, other officers elected were: first vice president, W. C. Philpot, works superintendent, Consumers Gas Co., Toronto, Ontario; second vice president, Col. Thomas Weir, controller, Union Gas Co. of Canada, Chatham, Ontario. The post of George W. Allen, Gas Survey Engineer, Toronto, Ontario, was changed from that of secretary to executive secretary and treasurer.

CALLENDAR

July

Metropolitan Heating and Air Conditioning Council—Union, N. J., July 28.

September

Mid-West Gas Association, 2nd of four one-day sectional meetings—Omaha, Neb.

Pacific Coast Gas Association, Annual Meeting—Ambassador Hotel, Los Angeles, Sept. 13-14.

October

National Safety Congress—Sherman, Morrison and La Salle Hotels, Chicago, Ill., October 3-5.

American Gas Association—Stevens Hotel, Chicago, Ill., October 5-6.

November

Mid-West Gas Association, 3rd of four one-day sectional meetings—Minneapolis, Minn.

American Petroleum Institute—Stevens Hotel, Chicago, Ill., Nov. 13-16.

George H. Smith To Head Natural Gas Department

GEORGE H. Smith, chief Gas Materials Section, Office of War Utilities, War Production Board, has been appointed director of the Natural Gas Department of the American Gas Association, effective August 7, and will be an assistant managing director of the Association. The announcement was made by Alexander Forward, managing director of the Association and J. French Robinson, chairman of the department and vice president of the Association.

G. H. Smith

Mr. Smith, a B.S. in civil engineering, has in recent years been in charge of passing on applications for priorities submitted by natural gas and manufactured gas companies, both domestic and foreign. Eighty per cent of the cost of these projects was represented by the natural gas industry. His counsel and advice have been continually called upon in connection with the issuance of limitation orders and other forms of wartime control. In addition, his duties in Washington have afforded him the opportunity to become familiar with nation-wide problems of the gas industry and he is well known to the staffs of other Government agencies, including the Federal Power Commission and the Securities and Exchange Commission.

Following 15 years of gas utility operating experience, Mr. Smith became associated with the Empire State Gas and Electric Association, composed of members from natural gas, manufactured gas and electric utilities. He was managing director of that association for eight years.

Production; Chemical Group Holds New York Meeting

THE problems of the future again took the center of the stage, before an audience of 400 production and chemical men at the AGA'S Joint Production and Chemical Conference held in New York on June 6 and 7, the program taking shape under the guidance of Chemical Committee Chairman V. J. Altieri, Eastern Gas and Fuel Associates, Everett, Mass. and Gas Production Committee Chairman F. J. Pfluke, Rochester Gas and Electric Corp.

Among the many problems brought before the meeting were (1) the de-

ANOTHER STEP IN...
POST-WAR action
PLANNING
Getting ready
for the post-war market
with Gas Refrigeration Now!...
A PROGRAM FOR GAS COMPANIES
PREPARED BY SERVEL, INC.

Here's a plan of action for building tomorrow's market for Gas... *Today!*

NATIONAL MAGAZINE ADVERTISING

2 LOCAL NEWSPAPER CAMPAIGNS

PROMOTION MATERIAL: BOOKLET, DISPLAYS, ETC.

IT IS estimated that automatic refrigerator sales during the post-war period will reach a total of nearly one-half billion dollars. While Gas Refrigeration will enjoy a good percentage of this market, Gas Companies can assure themselves of an even greater share by building a sound sales foundation—starting right now!

Gas Refrigeration has a dramatic story to interest the American housewife today, more than ever. It's the story of the only automatic refrigerator with no moving parts in its freezing system to wear out or make noise. This is especially appealing to the owner of a noisy, worn-out automatic refrigerator. What's more, a national campaign for Gas Refrigeration has already begun in seven of the country's leading magazines, with the theme, "Servel Gas Refrigerators stay silent... last longer."

To help you get the full benefit of these two pre-sale stimulators, Servel has prepared a comprehensive portfolio outlining a complete campaign that will give you a definite tie-in in your community with Gas Refrigeration's national advertising. This campaign consists of two local newspaper campaigns, suggested outdoor posters, window displays, and a mailing piece.

If you haven't already received this new portfolio, "Getting Ready for the Post-War Market With Gas Refrigeration—Now," write for your free copy today. Address Servel, Inc., Advertising and Sales Promotion Department, Evansville 20, Indiana.

Servel, Inc.
EVANSVILLE 20, INDIANA

P.C.G.A. PUBLICIZES A.G.A. LABORATORY

Visit the American Gas Association Testing Laboratory in Los Angeles, and see how a great industry regulates itself. ★ So urges a recent P.C.G.A. advertisement in *Building Standards Monthly,* official organ of Pacific Coast building inspectors. ★ The inspectors are also reminded that: "The A.G.A. Seal of Approval is your assurance of safety and performance standards exceeding building code requirements." ★ Thus, and in other ways, the gas industry of the West staunchly supports the national testing-and-approval program, and reminds regional inspectors of its significance in relation to the Uniform Building Code.

THE PACIFIC COAST GAS ASSOCIATION

GAS FUEL.

SERVING THE WEST IN WAR AND PEACE

termination of future costs of manufactured gas; (2) a discussion of the available reserves of special purpose coals; (3) the development of data and the sponsorship of research on gas conditioning; (4) the further improvement in safety practices in manufactured gas plants.

Processes of high Btu. production, the use of oxygen in gas production, means of increasing carburetted water gas set capacity, and domestic coal stokers were other topics reviewed at the meeting.

The Wednesday session brought forth papers on mixed gas research, carburetted water gas as a substitute for coke oven gas, butadiene manufacture, use of gas detectors, studies on identifying and controlling stilbaceous mold in purifying sponge, and a paper on the industry's viewpoint toward gas enriching oils.

Wisconsin Group Elects S. B. Sherman

The Wisconsin Utilities Association has elected S. B. Sherman, Racine, vice president and general manager of the Wisconsin Gas & Electric Co., as president to succeed John G. Felton, La Crosse. Mr. Felton becomes chairman of the Association's Advisory Committee.

Mr. Sherman is an Honorary Veteran member of the Wisconsin Utilities Association and has been chairman of the Gas section and numerous committees.

Other officers elected were: M. H. Montross, Wasau, vice president; Alfred Gruhl, Milwaukee, assistant research engineer for Wisconsin Electric Power Co., treasurer, succeeding D. W. Faber, Milwaukee.

NGAA to Study Corrosion Of Production Equipment

The Natural Gasoline Association of America is organizing a cooperative research program to study the new problem of corrosion of high-pressure production equipment, according to Thomas S. Bacon, research engineer for Lone Star Producing Co., Dallas who said a committee recently appointed to study this problem "has concluded that the industry should superimpose a centralized research program on the various individual research efforts that are under way at present."

McIlvaine to Lead SCMA

The next regular monthly meeting of the **Southern California Meter Association,** designated as "Ladies Night," will be held at the Rio Hondo Country Club, July 20, at 6:30 p.m., and will be led by the Association's new officers Mark McIlvaine, SCMO, president, C. L. Hutchings, Tidewater Associated Oil Co., vice president, Lee Cheever, Southern Counties Gas Co., treasurer and G. H. Forster, Texas Co., secretary. The meeting will feature a paper entitled "Review of the Southern California Meter Association Meter Course, Publication No. 12" to be given by J. T. Cortelyou, Southern California Gas Co.

Mr. Cortelyou will review all papers presented during the year, and since he will present the fundamentals of the various phases of gas measurement and metering without technical details, ladies now working in this field are urged to attend (with the thought that they will receive a background that will make their work more interesting).

A quiz program will also be presented, and members and guests are asked to submit questions to a board of experts composed of Jack Cortelyou, Southern California Gas Co.; Larry Cowan, Union Oil Co.; Melroy Welsh, Barnsdall Oil Co.; and Curtis Cortelyou, General Petroleum Corp. If the board fails to answer a problem, the questionee will be rewarded with a free drink at the bar. All questions must have a direct bearing on the meter course presented by the Association during the year.

Other members elected to the board on June 15 are: Curtis G. Cortelyou (Programs); Gordon Green, Robinson Orifice Fitting Co. (Entertainment); Melroy Welsh (By-Laws); E. P. Valby, Richfield Oil Co. (Standards); H. F. Keans, Union Oil Co. (Membership); R. N. Christensen, Southern California Gas Co. (Publicity); J. T. Cortelyou, past president, and R. T. Furlong, Texas Co. as San Joaquin Valley Chairman of Committees.

Cincinnati Gas Wins Twice In PUAA Competition

National awards in the Public Utilities Advertising association "better copy contest" were presented to 12 companies by Thomas H. Spain, retiring president, on June 7 at the annual meeting in Chicago.

Gas Companies honored at the conference were: The Cincinnati Gas & Electric Co., with two awards, one in nutrition advertising and one in radio advertising; The Peoples Gas Light & Coke Co., with the award in newspaper advertising supporting the war effort; and the Wisconsin Public Service Corp., with the window or inside display award.

Elected to the presidency was Russell I. Seymour, Kansas City Power & Light Co. Among other officers chosen, the gas industry was represented by Waldo M. Wright, Amarillo Gas Co., as secretary and Dale Remington, Wisconsin Public Service Corp., Green Bay as treasurer.

Maryland Ass'n Elects W. B. Bennett President

The Maryland Utilities Association, at its recent annual meeting, elected as president William B. Bennett, Capital Transit Co., Washington, D. C. Other officers elected were: Henry S. Davis, Conowingo Power Co., Elkton, Md., vice president; J. Carl Fischer, Consolidated Gas, Electric Light & Power Co., Baltimore, treasurer; and Raymond C. Brehaut, Washington Gas Light Co., Washington, D. C., secretary.

Selas Co. Changes Name

Necessitated by recent expansion and ramifications of the company's domestic and export activities, The Selas Company has announced official change of its corporate name to Selas Corporation of America. There will be no change in organization service, personnel, or objectives according to executives of the company.

There's an IMPORTANT place for the

WARD FLOOR FURNACE

in your Post-War merchandising program

When the war ends, there's going to be a tremendous demand for unit-type floor furnaces. Countless new single story homes, as well as thousands of existing dwellings, will require this low-first-cost, low-operating-cost equipment.

For 35 years, the Ward Heater Company has specialized in gas heating equipment. The Ward Floor Furnace has earned a nationwide reputation for advanced engineering, precision manufacture and quality products. And *that* spells *consumer acceptance!*

Ward Heater Company

1800 W. WASHINGTON BLVD., LOS ANGELES, CALIFORNIA

PIPELINE CONSTRUCTION NEWS

• **Interstate Pipe Line Co.**, Lee's Summit, Mo., has asked FPC for a certificate of public convenience and necessity to operate about 8½ miles of 2-in. to 6-in. pipeline acquired from its affiliate, the Interstate Gas Co. of Harrisonville, Mo.

• Pipe from the McAllen, Tex. natural gas field was laid last month to **Valley Vitamins, Inc.**, a $200,000 plant now under construction. This is the second large agricultural industry to get gas from the McAllen field, the first having been the Universal Colloids Co., manufacturers of metallic pectinate. With three wells drilled, the McAllen field has an estimated production of about 21,000,000 cu. ft. daily, and engineers say that within a radius of 75 miles of McAllen there is already a proved reserve of six trillion cu. ft. The field is also supplying 7 fruit and vegetable canning plants and various other smaller industries.

• **Cities Service Gas Co.**, Bartlesville, Okla., has received FPC approval to construct and operate (1) a cooling tower and miscellaneous equipment at the company's Blackwell compressor station in Kay County, Okla., and (2) 35 miles of 16-in. loop line from the Blackwell station to Burbank, Osage County, Okla. The facilities will be used for the transportation of increased volumes of natural gas from the "West side" to the "East side" of the company's pipeline system where the demands are greatest, and thus assure continued service to the applicant's "East side" customers, including many war industries. The order provides that the company shall complete the construction of the facilities on or before Dec. 31, 1944.

• **The Zenith Gas System, Inc.**, Alva, Okla., during June was constructing 15 miles of 6 5/8-in. line, from its system to connect with two gas wells in the Eatna, Kansas, gas field. The production of these wells, which averages approximately four million cu. ft. daily each, will supplement the supply of the Zenith System, Lewis A. Robertson, vice president of the company said.

The gas wells are producing at a rock pressure of 1630 lb. each, making construction of compressor facilities unnecessary. The line is of high carbon tested steel.

Zenith has also signed a contract to supply natural gas for all requirements of the Santa Fe railroad shops at Waynoka, Okla. The demand is expected to range from 400,000 to 500,000 cu. ft. per day. The company also owns and operates the gas distribution system of Waynoka, a division point on the Santa Fe system, with approximately 2000 population.

• **Pacific Gas & Electric Co.** is now expanding its natural gas lines from the Rio Vista dry gas field, biggest source of Northern California natural gas.

The program calls for 50 miles of new mains to cost $2 million and increase gas carrying capacity of the system by 75 million cu. ft. New gathering lines also are going in at Rio Vsita where new drilling is in progress.

Although no statement has been made, the company is known to be continuing consideration of participation in a plan with **Southern California and Southern Counties Gas Companies** in probable conjunction with **Phillips Petroleum Co.**, of building a new natural gas carrying line from West Texas or Kansas to California to augment California natural gas supply which is expected to be heavily affected for the long pull by the wartime oil development.

• **West Texas Co.**, Lubbock, Tex., has applied to FPC for permission to operate certain natural gas facilities in Hale, as follows: (a) about 8 mi. of 10¾ in. loop line immediately south of the company's Plainview compressor station in Hale County, and (b) an additional 400-hp. engine at the applicant's Turkey Creek compressing station in Potter County.

West Texas also asks authority to construct and operate an additional 400-hp. engine at the McSpadden compressor station in Randall County.

• Hearing was held last month before the FPC on applications filed by **El Paso (Texas) Natural Gas Co.** for permission to construct and operate the following facilities: (a) 31.5 miles of 16-in. pipeline beginning at the Eunice compressing station and extending in a southerly direction to El Paso Natural's Jal plant No. 1, located in Lea County, New Mexico; (b) five 800-hp. gas compressor units at the Eunice compressing station; (c) two 24-in. gas scrubbing towers at the Eunice station, and (d) two 24-in. gas scrubbing towers at Jal plant No. 1.

• **The Kansas Power and Light Co.**, Topeka, is seeking FPC authority to construct and operate additional natural gas facilities in Kansas. The project consists of about 38,000 ft. of 8-in. pipeline extending in a southwesterly direction from the Cities Service Gas Co.'s Breitenbach No. 1 and English No. 1 gas wells to connect to the applicant's existing 8-in. line in Edwards County, Kan.

• An FPC hearing has been held on the application of the **Missouri Western Gas Co.**, Butler, for a certificate of public convenience and necessity to construct and operate certain additional natural gas facilities in Missouri. The company proposes to construct and operate 21 miles of 3½-in. and 4-in. pipeline extending from the **Panhandle Eastern Pipe Line Co.'s** measuring station north of Harrisonville, Mo., along U. S. Highway No. 71 to the applicant's 4-in. line at Adrian, Mo., and a regulator station.

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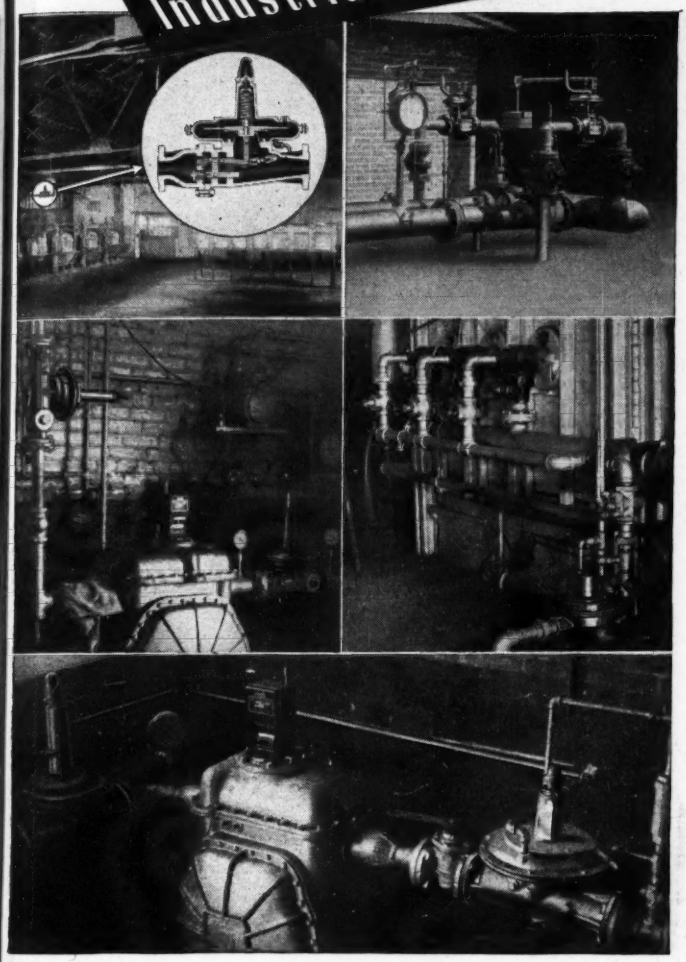

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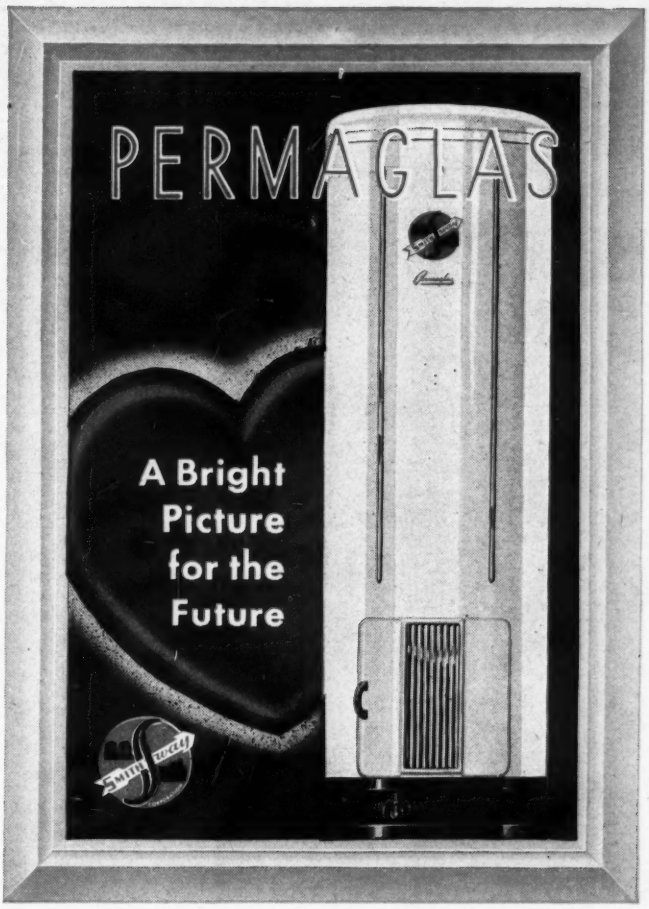

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The tank cylinder, the two heads and the flue are individually glass-lined before assembly. This permits minute inspection of every square inch of the glass-lined surfaces. When finally assembled by SMITHwelding, the result is a strong, flawless tank that will give years of carefree service.

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NEW PRODUCTS

Gas Analyser

Cambridge Instrument Co., Inc., 3732 Grand Central Terminal, New York, N. Y.

Model: 4-Point Gas Analyser.

Application: To provide simultaneous analysis and continuous graphic record of the amounts of oxygen, carbon dioxide, carbon monoxide, and hydrogen in a sample of combustion products. Its use enables close control in chemical processes, oil refining and in the operation of various types of kilns, inert gas producers, furnaces in the metallurgical industry, etc.

Operation: A continuous sample of the gas is drawn into the analyser by means of a water bubbler-aspirator. The analysis procedure varies with the constitutents of the sample, but may involve a chemical absorption and/or combustion. The aspirator also meters the gas, as well as the air which may be required for combustion in the analysis procedure. The recorder is automatically connected to the circuit of each analysis cell in sucession, the duration of each connection being one minute. A continuous record of the analysis is provided on a 10-in. strip chart.

Fuel Cut-off

Combustion Control Corp., 77 Broadway, Cambridge 42, Mass.

Model: Fireye Flame Failure Safeguard Type 28C.

Application: A photoelectric system designed to provide instantaneous fuel cut-off in any pressure-fed burner (oil, gas, or pulverized coal) in the event of flame failure.

Description: Fireye Flame Failure Safeguard Type F28C is used with manually ignited burners to cut off fuel and sound an alarm; or, when the burner is automatically fired, with Program Relay Type R25, to program fuel pump and valve operation, intermittent ignition system, purging period, and recycling.

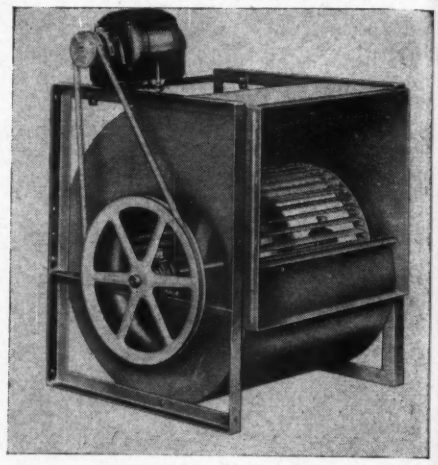
Designed to operate at relatively high ambient temperatures, Type F28C is mounted directly on the furnace wall and watches the flame through a window in the wall of the fire chamber. Once the lens of the optical system has been aligned, the field of vision of the electric eye is limited to the flame itself and extraneous light is rejected. Light from the flame strikes the sensitive plate of the photocell and starts a flow of electrons, producing a minute electrical current. After passing through a vacuum tube, this current is amplified sufficiently to operate a relay which directly controls a solenoid valve governing fuel feed, or Fireye Program Relay Type R25, which programs the entire cycle of burner operation. While the electric eye sees flame, Fireye feeds fuel to the burner. Should flame fail, or any condition impairing safe operation develop, Fireye cuts off the fuel supply until proper combustion conditions are restored.

Blowers

Utility Fan Corp., 4851 S. Alameda St., Los Angeles (11).

Model: No. 3 Arrangement Blowers.

Description: Four-way discharge is feature of these new standard duty blowers, since design permits installation in any of following discharge positions: top horizontal, top vertical, bottom horizontal and bottom vertical. While blowers are furnished with bearings assembled for top horizontal discharge, only a simple change in bearing position is involved in altering discharge. Illustration shows unit in top horizontal position.



Units are belt-driven, with wheel diameters from 9 to 24 in., single inlet, single width and double inlet, double width. Can be furnished on proper priority order.

Pipe Compound

X-Pando Corp., 43-45 36th St., Long Island City, N. Y.

Product: X-Pando Pipe Joint Compound.

Application: A pipe joint compound for use in pipelines carrying Calodorent and Pentalarm.

Description: X-Pando Pipe Joint Compound is a special cement which expands as it sets, thus correcting imperfection in threads and smoothing flange faces, yet permitting joints sealed with it to be readily taken apart.

Floor Cleaner

Kelite Products, Inc., Los Angeles.

Model: No. 158 Heavy Duty Cleaner.

Application: For cleaning shop floors where grease and oil accumulate.

Description: This material is a powder which dissolves in hot water and can be applied with either mop or brush. If allowed to soak in for 10 to 15 minutes, Kelite No. 158 will clean up dirty floors with a minimum of difficulty, it is claimed.

Catalogs

• **Eimco Corp.,** 634-666 S. Fourth West St., Salt Lake—Bulletin F2002, a well-illustrated 48-page catalog covering the company's complete line of continuous vacuum filters and dryers. This publication should be of particular interest to chemical and other process industries that have a dewatering or filtering problem.

• **Natural Gas Ordorizing Co.,** Louisiana National Bank Bldg., Baton Rouge 2, La., has published a 16-page booklet, "Data on Gas Odorization with Captan," outlining a complete plan for the odorization of a gas distribution system. The sections on equipment, odor control, and how to conduct a room test are of particular interest to distributors of natural gas.

• **Minneapolis-Honeywell Regulator Co.,** Minneapolis, Minn., has recently issued a 20-page booklet, "Heating and Air Conditioning the Postwar Home," serving to introduce their new product Moduflow. Moduflow control is designed to eliminate heat "lags" and "overshoots," and to save fuel for postwar home-owners. It is a system of controls to be applied to the heating plant, and not to be confused with heating equipment. Illustrated with sketches and diagrams, the pamphlet explains in simple non-technical language the principles behind Moduflow, and the difference between this product and conventional heating systems.

• **The Burdett Mfg. Co.,** 19 N. Loomis St., Chicago 7, Ill., has just released a new 114-page catalog illustrated and describing Burdett "Infra-Red" principle gas burners and combustion equipment as well as much engineering and reference material.

This new catalog will be sent only to distributors and industrial sales engineers upon request written on their company stationery.

It includes burners, mixing equipment, valves, gas pressure regulators, motors and blowers, pilot safety devices, temperature controls, electrical accessories and general engineering data such as velocity pressures, motor ratings, measurement of electrical power, calculating power requirement tables and charts, heat losses, thermal capacity of gases, etc.

Publishing of this new distributor and engineering catalog was prompted by the company's plans for greatly extended sales efforts from coast to coast and the addition of many more engineer-representatives to cope with both the present heavy war effort demands and future industrial requirements.

It is claimed by users of Burdett "Infra-Red Principle" gas burners that as much as 300% increase in production has been affected in most industries by this heat process and the cost of operation has been materially reduced at the same time.

A copy of the new catalog and information concerning the companies rapidly expanding sales organization may be had by writing direct to the manufacturer.

• **Fischer & Porter Co.,** 940 Country Line Rd., Hatboro, Pa., offers a new, instructive catalog on the F&P Rotameter, the area-type flow meter that has been manufacured for measuring the flow rate of liquids and gases. This catalog, 10-B, entitled "A New Era in Flow Rate Measurement" contains 32 pages.

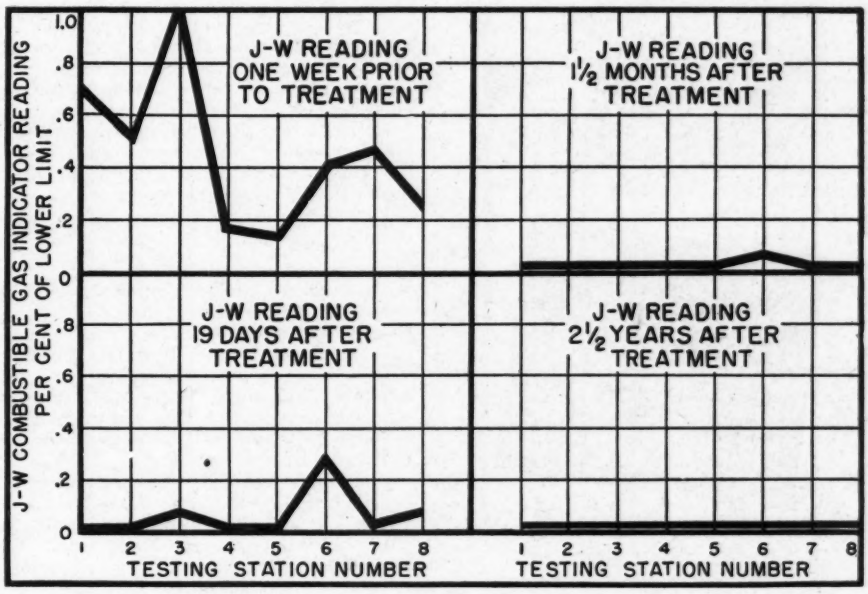
Each basic advantage of the Rotameter is thoroughly discussed: How it works; its degree of accuracy; how it can be made immune to variations in viscosity and specific gravity. A list of fluids successfully handled and some typical applications are included.

The catalog also contains information for engineers with flow rate problems.

• **The Bristol Co.,** Waterbury 91, Conn. announces a new bulletin No. B220 describing its new line of Free-Vane Electronic Controllers for automatically controlling temperature, pressure, liquid level, and humidity. The bulletin gives wiring diagrams, principle of operation and general description and features of the new instruments.

• **Surface Combustion,** Toledo 1, Ohio, has available a 24-page spiral-bound, extensively illustrated brochure entitled "Heat for the Glass Industry," enumerating the advancement and achievements Surface Combustion, which utilizes the principle of convection heating for annealing glass within given critical temperature ranges, has made in recent years.

Actual Tests of Gas Leakage Show the Value of *Carboseal Anti-Leak*



Notice how the graph shows that leakage from bell and spigot joints was materially decreased within nineteen days after treatment with Carboseal Anti-Leak. In one and one-half months leakage was almost completely stopped, and joints were still tight two and one-half years after treatment.

To learn more about how this effective low-cost treatment can be used in your gas distribution system write for the booklet, "Correcting Leakage in Gas Distribution Systems with Carboseal Anti-Leak." It will tell you how Carboseal Anti-Leak is applied, how much it costs, and what results can be obtained.

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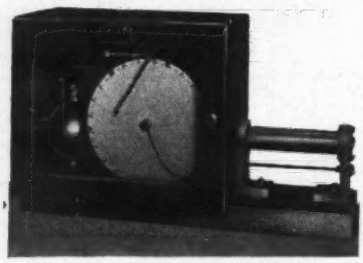
are installed on the
WEP 20" LINE



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PEOPLE

Dr. J. J. S. Sebastian

• **Dr. John J. S. Sebastian** has been appointed to the research staff of the Institute of Gas Technology at Illinois Institute of Technology, it has been announced by Prof. John I. Yellott, director of the Gas Institute.

He will serve as associate supervisor of the coal and gasification research section of the Gas Institute and will be in general charge of research on fluidized gas generation, upgrading of low Btu gas, and related projects.

Dr. Sebastian was research associate in the coal research department at Carnegie Institute of Technology 11 years, and earlier in his career worked as research engineer for the Koppers Co. at Mellon Institute, Pittsburgh, Pa., and as assistant chief chemist for the Interlake Iron Corp., Chicago.

Immediately prior to his appointment, Dr. Sebastian was general manager of the Balsam Mining and Manufacturing Co., Inc., Waynesville, N. C.

Dr. Sebastian has presented many outstanding technical papers.

• **Michael E. Shea,** former director of the fuels and utilities division of the War Production Board, was elected president and manager of the Roanoke Gas Co. at a recent meeting of the board of directors. **W. J. McCorkindale** who has been valuation engineer since 1936, was appointed assistant to the manager.

Shea was general superintendent of the Roanoke Gas Co. from 1933 to 1938, when he accepted an appointment to the SEC where he remained until 1941, at which time he became associated with Atlantic Seaboard Corp., a natural gas pipeline and holding company of the Columbia Gas & Electric System.

• **Arthur E. Schanuel** has been appointed executive secretary of the Indoor Climate Institute effective as of July 1, according to an announcement by **P. B. Zimmerman,** president of the organization, Mr. Schanuel resigns as secretary of the National Electrical Manufacturers Association to assume his new duties. He is a former newspaper and advertising man and has a wide acquaintanceship throughout the building and public utility fields. The Institute has new offices in the Penobscot Building, Detroit.

• **Cecil F. Elmes** has been appointed consulting engineer to the newly formed Alberta natural gas utilities board, Hon. N. E. Tanner, minister of lands and mines has announced. Mr. Elmes will make his headquarters in Calgary.

The board is composed of **G. M. Blackstock,** K.C., who is public utilities commissioner for the province, and **Dr. E. H. Boomer,** chairman of the petroleum and natural gas conservation board.

The Natural Gas Utilities Act, passed at the last session of the legislature, declared null and void the exclusive features of contracts for the supply of natural gas from the Turner Valley field. The act provided that in all other respects contracts must be submitted to the board for review and alteration. Mr. Elmes will act in a consultative capacity to the board in dealing with proposed variations in contracts, and similar matters.

• **Dr. E. P. Schoch,** University of Texas research chemist now working with natural gas, will assist United Gas Co. with a study of South Texas and East Texas fields. Early in the war, Dr. Schoch was engaged on a process to produce from natural gas materials for synthetic rubber. He is an exponent of conserving gas because of its actual and potential value as a raw material for plastics and other products from industrial chemistry.

• **Walter H. Spears,** Shreveport, general superintendent of the land, geological and mapping departments of the Union Producing Co., was elected vice president of the company at a meeting of the board of directors in the company offices at Shreveport this week, according to an announcement made by **N. C. McGowen,** president of the company.

Spears entered the employ of a predecessor company in January, 1931, as a geologist, beginning work in the general offices at Houston. In 1937 he was promoted to the position of assistant superintednent of the exploration department, and two years later became the district manager in charge of Houston district operations of the company. In November, 1940, Spears was appointed general superintendent of land, geological and mapping departments.

• **Hudson R. Searing,** a director of Brooklyn Edison Co. and the Yonkers Electric Light and Power Co., was elected executive vice president of Consolidated Edison Co. of New York, Inc., May 16. He has been vice president in charge of the electric and gas production and operation department since December, 1940.

Mr. Searing, a graduate of Cooper Union, B.S. in electrical engineering, joined Consolidated Edison in 1909 as a telephone operator. During the first world war he served as a second lieutenant in the Signal Corps, and after returning to the company advanced through the engineering departments until he became engineer of operation in 1939.

• Three new members have been appointed to the Petroleum Industry War Council it was announced June 22 by Deputy Petroleum Administrator **Ralph K. Davies.**

Appointees are: **Arch A. Rowan,** of Dallas, Texas, president, American As-

✓ **Ideal for venting gas-burning appliances**

✓ **Light weight—easy to install and support**

✓ **Can't Rust**

✓ **Needs no painting**

✓ **Relatively low heat conductivity**

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✓ **Full range of sizes, 2" to 12"**

✓ **Complete line of Fittings and Accessories**

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JOHNS-MANVILLE JM PRODUCTS

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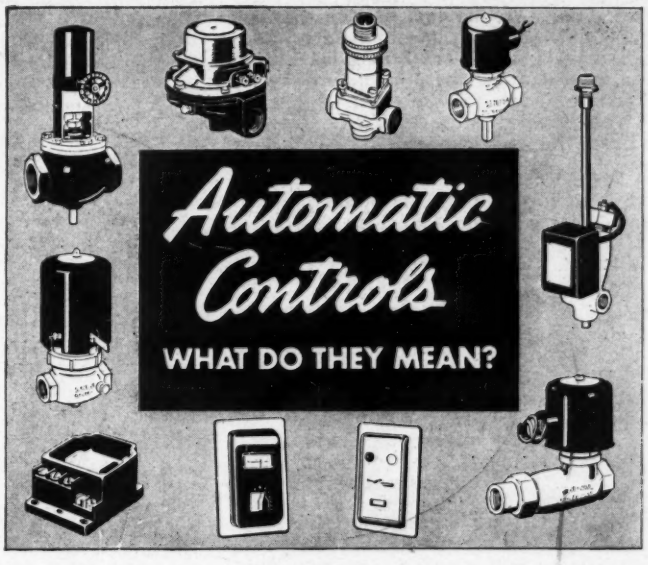
TRANSITE FLUE PIPE

For venting gas-burning appliances



Automatic controls of pressure, temperature and flow assure *pre-determined accuracy of results* wherever they are used. No thinking executive, production manager or maintenance engineer can miss the full significance of this statement.

In factories and plants of every size and kind, *automatic controls* increase productive output and reduce waste by simplifying operations, speeding work, and assuring uniformity of finished product. With controls, even the most inexperienced novices quickly attain proficiency.

In homes and buildings, large and small, *automatic controls* promote economy, comfort, health by providing optimum temperature and humidity, saving fuels and doctors' fees.

On stationary equipment such as presses, machine tools, internal combustion and diesel engines, *automatic controls* save materials, plumbing, space, time and money.

On moving equipment such as aircraft, ships, tractors, trucks, tanks, locomotives, **hi-g** *light-weight controls* assure efficient performance because they operate in any position, regardless of vibration, change of motion or acceleration. **hi-g** saves weight and space.

Although now engaged full-time in supplying war needs, General Controls' staff of "straight-thinking" engineers invite your request for help in solving your post-war control problems. For complete description of General Controls' broad line of automatic pressure, temperature and flow controls, write for Catalog 52.

HIGH CAPACITY AT LOW COST

V-300 Low Pressure Gas Regulators are compact, built to last. For natural, manufactured and L.P. gases. Sizes from ⅜" to 2" I.P.S. Outlet pressures from 2" to 5"; factory setting 3½" for average appliance use.

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sociation of Oilwell Drilling Contractors; **James W. Vaiden,** of Tulsa, Okla., president, Natural Gasoline Association of America; and **Ferd Spang,** of Butler, Pa., president of the Petroleum Equipment Suppliers' Association.

Membership of the PIWC is thus increased to 78 members.

• Effective May 1, **William R. Teller,** chief research engineer, became assistant director of the American Gas Association Testing Laboratories, according to **R. M. Conner,** director.

Mr. Teller was graduated from Case School of Applied Science in 1927 with a degree in mechanical engineering. After three years of field experience in gas and oil production, he joined the Laboratories staff in Cleveland. His experience over the past 14 years has included testing, inspection, research, and more recently war development activities. Shortly after Pearl Harbor he was placed in charge of the newly-formed War Products Department. In addition to this responsibility he has for the past year directly supervised all Laboratories domestic gas research projects.

• The American Petroleum Industries Committee recently announced the election of **Edwin S. Hall,** as chairman and **Cyrus S. Gentry** as secretary of the committee. Mr. Hall succeeds Col. **Harry T. Klein,** who recently resigned upon his election to the presidency of The Texas Co.

Mr. Hall, vice president of the Standard Oil Co. of New Jersey, has been secretary of the American Petroleum Industries Committee since its formation in 1932. He has been associated with Standard since 1920, became senior counsel in 1933, and was made a director in 1934. He was elected a vice president of the company in 1940.

Cyrus S. Gentry, vice president and Secretary of the Shell Oil Co., and general counsel for the territory east of the Rockies, has been a member of the American Petroleum Industries Committee since 1941. Mr. Gentry started his career with Shell in 1933, taking charge of the legal work for Shell Petroleum Corp. in St. Louis. He was named secretary of Shell Union Oil Corp. in 1937. In 1940 he became secretary of Shell Oil Co. and general counsel for the territory east of the Rockies. He became vice president of the company on June 1 of this year. retaining his former duties.

• **E. G. Dahlgren** has been appointed acting secretary of the Interstate Oil Compact Commission, succeeding Mr. Charles L. Orr. Since 1942 he has been secretary of the Technical Committee of the Commission and a few months ago was appointed assistant secretary of the Commission. Before coming with the Commission he had been with the PAW and SEC in Washington, and for a time served as director of the Conservation Commission of the Kansas Corporation Commission, and with the Oklahoma Corporation Commission.

Ted Knoop and Eugene Wilson, key assistants, will divide duties under Mr. Dalgren.

• Secretary of the Interior **Harold L. Ickes** announced the appointment of **George A. Lamb,** Idaho, former chief of the Economics and Statistics Division of the Solid Fuels Administration for War to the new post of assistant director of the Bureau of Mines.

Manufacturers

G. S. Jones

• **Geo. S. Jones,** Jr., vice president in charge of sales at Servel, Inc., was elected president of the National Federation of Sales Executives recently in their second wartime conference at the Edgewater Beach Hotel in Chicago.

Mr. Jones, who has served on the board of the Federation for several years succeeds **Harry C. Anderson** of the A. B. Dick Co. of Chicago, who became chairman of the board.

• **Paul B. Holmes,** has been appointed manager of the sales of the heating division of The National Radiator Co., Johnstown, Pa., according to a recent announcement. He has been with the company for 27 years, and has been branch manager of the Washington division since 1935.

• **E. J. Zimmer, Jr.,** has just been appointed assistant to **L. B. Keplinger,** vice president and director of sales for Rheem Manufacturing Co. Mr. Zimmer will concentrate on the development of sales for new postwar products which will include household utilities in addition to the current line of automatic water heaters, space heaters, boilers, pressure tanks and other items.

Rheem also manufactures a full line of steel containers for the petroleum, food and beverage, paint and varnish, and chemical industries.

On Active Duty

• Lieutenant **Henry F. Pinkvoss,** previously structural engineer with the Cincinnati Gas & Electric Co., has been promoted to the rank of Lieutenant Colonel. He has been on active service with the Coast Artillery Corps. since 1941.

• **Capt. Deke Houlgate,** formerly representative of the American Gas Association in Hollywood, has been promoted to major in the Army Air Forces. He is public relations officer for the A.A.F. Western Flying Training Command at Santa Ana, Calif.

• **Lt. Col. Albert E. Higgins,** former executive vice president of the Pittsburgh Equitable Meter Co. and secretary of the Natural Gas Department, AGA has been appointed commanding officer of the 21st Ferrying Group, Ferrying Division, Air Transport Command, at Palm Springs, Calif., it was announced by Brig. Gen. William H. Tunner.

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Many Standard Meter Parts Carried in Stock

We will be pleased to submit quotations to your specifications and blueprints.

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Blue Gas Plants
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Washer Coolers
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Gas Purifiers
Condensers
Waste Heat Boilers
Producer Gas Plants

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Obituaries

• **Joe H. Gill,** president and chairman of the board of Electric Power & Light Corp. and president of United Gas Corp. died recently in New York City. Mr. Gill, who was recognized as an outstanding leader in the electrical and natural gas industries, will be buried in Dallas, Tex., his former home.

• **George H. Boyd,** 55, manager of the service inspection and records department of the Consolidated Edison Co., of New York, since 1938, died April 15.

Mr. Boyd joined Consolidated Edison in 1911 as a draftsman, and later served as superintendent in the gas distribution department. He was a member of the Gas and Electric Association, and a governor of the former Gas Company Mutual Aid Society.

• **Prescott B. Wiske,** 56, sales service manager of Servel, Inc., Evansville, Ind., died of a heart attack June 5, while attending the Midwest convention of the Liquefied Petroleum Gas Association in Denver. Formerly associated with the Brooklyn Union Gas Co., Mr. Wiske joined Servel in 1932, where he subsequently served as retail stores manager, regional sales manager and sales service manager.

• **Alfred M. Ogle,** 61, president of the Indiana Gas and Chemical Co., Terre Haute, Ind., died recently of a heart attack in Washington.

Mr. Ogle founded the company and had been president since its inception in 1915. Four years ago the company purchased the Indiana Gas Utilities Co. in Terre Haute and organized it under the name of Terre Haute Gas Corp.

He had been active in the by-products coke industry, serving as administrator for bituminous coal under the National Fuel Administration in World War I, and as chairman of the by-products coke industry committee to the OPA in this war.

• **Adolph Mueller,** 78-year old chairman of the board of the Mueller Co., Decatur, Ill., died May 14 at his Miami, Fla., home after an illness of 10 days.

Considered a leading industrialist throughout the country, he was chiefly responsible for the expansion of his company from one factory in Decatur to three in that city, and one each in Chattanooga, Tenn.; Los Angeles, Calif.; Sarnia, Ontario and Port Huron, Mich., the last named eventually being sold to the Atlas Corp. The six plants employ 2100 men in the manufacture of plumbing and brass goods, and at the present time are heavily engaged in war production.

Though he started as a plumber's helper in the company founded in 1860 by his father, Mr. Mueller worked his way to the presidency and served in that capacity from 1902 to 1939 when he retired to become chairman of the board.

He had represented Central Illinois as a director of the Illinois Chamber of Commerce, had served as president of the Illinois Manufacturers Association and as president of the National Association of Brass Manufacturers.

• **Hilmar M. Papst,** vice president of Portland Gas & Coke Co., died suddenly June 22.

Born in Germany May 31, 1873, Papst received his public school and university education in that country, coming to the United States in 1892. From 1893 to 1900 he was an engineer for the United Gas Improvement Co., Philadelphia, working on a number of the system's properties. From 1900 to 1906, he was with the Equitable Gas Light Co. and the San Francisco Gas & Electric Co. and joined Portland in 1906, to take charge of the gas works and convert the old plant from coal to oil gas. He served as general manager of the Portland Gas Co. until 1910, when Portland Gas & Coke Co. was organized to take over the property, at which time he became vice president and general manager of the present company. For the past six years he continued as a vice president of the company, although retired from active responsibilities.

The gas company's present modern plant near Linnton was designed and built under Papst's direction and he is credited with having had a major part in the extensive development of the firm's important by-products business.

● ● ● following these suggestions. They will assure your cashing-in, regularly, on your "CLEVELANDS" built-in ruggedness and productive performance.

● Lubricate thoroughly and regularly. When lubricating, make certain that all fittings are open and all bearings taking grease. Be sure to replace any broken or damaged fittings. ● When making spot lubrication, check machine for loose or broken bolts, broken strands in cables, worn or broken links in chain and worn brake and clutch facings, and replace at once all damaged parts. ● Check Crank Case Oil level. Fill to full mark. ● Check coolant in radiator. If contaminated, it should be changed. ● Check carefully all bucket rooters for sharpness. Renew when dull. This is exceedingly important and will pay dividends. ● Keep Conveyor belt tension as low as possible without allowing belt to slip. ● Check fan belt for tension . . . water pump and radiator for leaks. ● Examine all wiring. See that connections are tight, wires clean and not damaged. ● Operate digger with Boom Level when desired depth is reached. Never "crowd" machine ahead so that it "labors."

THE CLEVELAND TRENCHER COMPANY
20100 ST. CLAIR AVE. "Pioneer of the Small Trencher" CLEVELAND, OHIO
"CLEVELANDS" Save More . . . Because they Do More

CURRENT READING

Army's Portable Pipeline—National Petroleum News, May 3, 1944, pp. R-251-256. How systems are laid out, pipe strung, pumping stations operated by army crews to supply gasoline to troops as they advanced to front line positions.

Cycling Has Significant Relation With Natural Gas Operations—R. W. Ducker and F. H. Dotterweich. "Oil and Gas Journal," May 11, 1944, pp. 107-109. In this paper, the authors project natural-gasoline and cycling operations through the war and into the postwar era to show the intimate relationship with the natural-gas industry and to point out some of the potentialities for close association in the future.

The Basic Gas-Turbine Plant and Some of Its Variants—J. K. Salisbury. "Oil and Gas Journal," May 18, 1944, pp. 59, etc. Part 1. This article presents a brief historical review of the gas-turbine plant, and a discussion of its operating characteristics and applications. The author touches briefly on thermodynamics, temperature, pressure relationships, the axial flow compressor, regeneration, intercooling, reheat, and fuel economy. Part 2. "Oil and Gas Journal," May 25, 1944, pp. 102, etc. This installment deals principally with regeneration, intercooling, reheat and fuel economy.

Compressor-Station Design for Long-Distance Natural-Gas Transmission Systems—M. C. Madsen. "Oil and Gas Journal," May 18, 1944, pp. 71, 72, 74. This article is a detailed outline of the factors that should be considered in designing a compressor station for a gas pipe-line system, ranging from the location of the site to dwellings for employees. The author treats briefly the chief items of equipment, and predicts a new form of compressor unit that will replace the old standbys of today.

A Study of Corrosion in Gas and Condensate Wells in Katy Field, Texas—F. W. Jessen. "Oil and Gas Journal," May 4, 1944, pp. 53, etc. An examination of data, considered to be representative, available from a well in the Katy field, Waller County, Texas, indicates that the corrosion of steel may be correlated with the rate of flow of gas, which in turn is believed to contribute largely to the rate of absorption of carbon dioxide. Evidence is presented to show that the rate of reaction of dissolved carbon dioxide with steel at the pressures and temperatures encountered in the operation of gas and condensate wells seems dependent on the rate of absorption of carbon dioxide and the length of time the fluid film is in contact with the metal. The continuity of a fluid film is questionable at higher rates of flow. It is believed that the ratio of condensed water to hydrocarbon condensate is also of considerable importance in the corrosion of steel by high-pressure gas.

Centrifugal Compression of Hydrocarbon Gases—E. O. Bennett. "Oil and Gas Journal," May 11, 1944, pp. 113, etc. This discussion is not a mathematical or thermodynamical treatise of compressors or combustion turbines, but simply a brief historical discussion of them, setting out where they might fit into the picture.

Infrared Spectroscopy—New Analytical Tool for New Processes—D. P. Thornton, Jr., "National Petroleum News," May 3, 1944, pp. R-274, etc. Author describes the spectrometer and its operation, and lists many of the uses of infrared spectroscopy, both in industrial applications and refining processes.

Cathodic Protection—Its Application to a Pipe Line—L. C. Secrest. "Oil and Gas Journal," May 25, 1944, pp. 82, 84. In this article are described some of the problems met during installation of cathodic protection on a western pipe line. Generator spacing, locating and installation of the ground bed, and maintenance costs are some of the features discussed.

Increased Oil Recovery by Gas Injection from Old Producing Sands at Salt Creek, Wyoming—N. Williams. "Oil and Gas Journal," May 18, 1944, pp. 57, 58. Benefits to be derived by injection of gas into old producing sands facing early depletion of pressures are demonstrated in the results of such a project in the Salt Creek field. Present rate of injection into the two sands concerned is approximately 20,000,000 cu. ft. daily. As a result of the project, started in 1926, average pressure has declined less than 3 lb. during the past 10 years and daily oil withdrawals are being sustained at a rate estimated at double that which otherwise would be possible.

Manual of ASTM Standards on Refractory Materials with other pertinent information and data. The latest manual is the fifth sponsored by ASTM Committee C-3 on Refractories. It includes new standards for air setting refractory mortars, fireclay plastic refractories both for boiler and incinerator services, methods of test for measuring the shrinkage, spalling, and workability index of fireclay plastic refractories, and a method for measuring the thermal conductivity of insulating fire brick.

Seven specifications on refractories for various types of service are given in the book. There are two classifications of materials and the remaining 16 standards give methods of testing, some specifically for fireclay refractory brick, others for fireclay plastic refractories, some for insulating fire brick and others for various types of refractory materials. The latter includes tests to determine PCE permanent linear change, cold crushing strength, warpage, porosity, true specific gravity.

Part of the book is devoted to a group of industrial surveys which describe the operations carried out in the furnaces, the types of refractories used in them, and outline the conditions which affect the life of the refractories.

This 210-page publication can be obtained from ASTM headquarters, 260 S. Broad St., Phila. 2, Pa., at $1.50, heavy paper cover; cloth, $1.75. Reduced prices on quantities are in effect.

Here's to the **SECOND DAY** **after the war**

Don't look for us the first day after the war. We'll be out . . . *celebrating.* But the second day we'll be back cleaning up our war contracts so that we can plunge into production of even better Klixon snap-acting gas valves and thermostats to meet *your* post-war production demands.

SPENCER THERMOSTAT CO.

KLIXON

ATTLEBORO, MASS.

STEEL SERVICE TEES *for welding*

Made of low carbon steel of the same analysis as steel pipe. Fully tested for use on gas pressures up to 500 lbs. per sq. in. Readily welded to any steel main or service pipe. Provide maximum safety since entire installation or shutting off of a service can be done without letting the gas blow. Rely upon MUELLER Equipment for best results.

MUELLER CO. DECATUR, ILL.

Coal Industry To Expand Development Program

Bituminous Coal Research, Inc., has announced the election of Dr. H. J. Rose, of Mellon Institute, Pittsburgh, as vice president and director of research in charge of the expanded investigational and development program of the bituminous coal industry.

This organization, composed of coal operators, associations, and railroads in the Appalachian and mid-continent coal fields, is enlarging its research projects on coal production and utilization to meet wartime needs and prepare for the industry's post-war position, and will invest more than $2,000,000 during the next five years.

Dr. Rose, a graduate of the University of Chicago and Carnegie Institute of Technology, has had extensive technical and administrative experience in coal research,

PAW Removes Limitation on Oil Well Abandonment

Petroleum operators may now abandone any oil well without giving prior notice to the Petroleum Administration for War, Deputy Petroleum Administrator Ralph K. Davies announced June 24.

Action was taken by revoking a formal recommendation (Recommendation 47), which required that notice be given 30 days prior to abandonment of any well producing more than one barrel of oil or 6000 cu. ft. of gas daily.

Robertshaw Thermostat Opens New Development Laboratory

Thomas T. Arden, president of Grayson Heat Control, Ltd., announces the opening of a new Research and Development Laboratory to serve the West Coast activity of the Robertshaw Thermostat Co., Youngwood, Pa., Grayson Heat Control, Ltd., Lynwood, Calif., and the American Thermometer Co., St. Louis, Mo.

S. G. Eskin, director of research, has inaugurated an extensive program emphasizing domestic and commercial appliance control and accessory research which is correlated with the work of the Robertshaw Research Laboratory at Pittsburgh.

Laboratory facilities include extensive experimental rooms, a complete machine shop for model construction, drafting rooms, a testing laboratory, conference room, library, and offices for staff engineers and scientists.

Located at 833 North Highland Blvd., Los Angeles, the new building is a short distance from the Lynwood manufacturing plant of Grayson Heat Control, Ltd.

Spearman Gas Co. Applies For Oklahoma Properties

The Spearman Gas Co., Mobeetie, Texas, seeks to acquire and operate all the Eldorado Gas Co.'s natural gas pipelines and appurtenant facilities in Oklahoma, subject to FPC jurisdiction. Total consideration to be paid by the Spearman Co. is $32,175.00.

Greatly expanded facilities for war production will make it possible for Utility to produce more and better gas-fired heating equipment when victory comes.

Peace-time Manufacturer of the Famous Utility Air Koolers, Blowers, Fans, Floor Furnaces, Circulating Heaters, Unit Heaters, and Force Air Furnaces.

UTILITY FAN CORPORATION

4851 South Alameda, Los Angeles 11, California

LARGE DIAMETER PIPE and FITTINGS including 48-inch

Acipco Cast Iron Pipe and Fittings are available in sizes including 48". Acipco Large Diameter Pipe are made by the Mono-Cast Centrifugal Process.

American Cast Iron Pipe Company
BIRMINGHAM, ALABAMA
Sales Offices in Principal Cities

SINCE 1897
BEST IN BRASS

K-CO

GROUND KEY Gas & Steam Valves

TEMPERATURE and PRESSURE Relief Valves

GAS SHUT-OFF Valves

A wholly owned subsidiary of WELSBACH ENGINEERING AND MANAGEMENT CORPORATION.

WELSBACH

KITSON COMPANY
1500 WALNUT STREET
PHILADELPHIA 2

Industrial Advertising Schedules Enlarged

AMERICAN Gas Association national advertising in trade, technical and business magazines will be substantially increased for the year beginning Sept. 1, 1944, it has ben announced by H. Carl Wolf, chairman of the Committee on National Advertising, and J. P. Leinroth, chairman of the National Advertising Committee of the Industrial and Commercial Gas Section. This increase will include several new industrial and commercial gas trade magazines, as well as a greater number of insertions in certain of the magazines that are being used this year.

In discussing the theme of the advertisements that will make up the enlarged program, Mr. Leinroth stated that it has become increasingly clear that (1) gas equipment for heat-treating and for other essential operations —in the metals, ceramics, and other fields—has been distinguishing itself for more than most people realize, and (2) that all this new knowledge of the application of gas will be of tremendous significance to industry during the reconversion and postwar period. Most recent industrial and commercial gas advertising has been founded on that dual theme.

"Back of all advertising is emphasis on the fact industrial gas has demonstrated, that it is meeting every requirement in the most important production program the nation has ever undertaken, and that it is certain to have a vital an dconstantly expanding role in our postwar economy.

The advertisements will be prepared by Ketchum, MacLeod & Grove Inc., Pittsburgh, Pa., in conjunction with the National Advertising Committee of the Industrial and Commercial Gas Section.

WANTED— SALES ENGINEER

Familiar with gas appliances. Knowledge of thermostatic controls valuable. Give full details in reply. Box 310 c/o GAS, 1709 W. 8th, Los Angeles 14, Calif.

WANTED

Man with engineering background having thorough knowledge of modern high and low pressure gas distribution practice, cleaning, dehydration, sizing of equipment, plant layout. Permanent position with large manufacturer. Write giving full transcript of experience. Box 270, c/o GAS, 1709 W. 8th, Los Angeles 14, Calif.

ENGINEERS

Age 26 or older. Openings at several locations in the U. S. East of the Rockies for liquefied petroleum gas marketing with a major oil company. Here is a remarkable opportunity for men with engineering education and administrative experience. State in detail, experience, draft status, age and salary requirements. Box 305 c/o GAS, 1709 W. 8th, Los Angeles 14, Calif.

Minnesota Markets Sought By Northern Natural Gas Co.

A hearing before the FPC on applications by the Northern Natural Gas Co., Omaha, Neb., for authority to sell natural gas to the Northern States Power Co. and Peoples Natural Gas Co. for resale in St. Paul, Minn., and vicinity, will be held July 26, 1944, in St. Paul.

The proceedings involve: (1) an application to sell approximately 120,000,000 cu. ft. of natural gas per year to Northern States for mixing with manufactured gas for resale for ultimate public consumption in St. Paul, South St. Paul, West St. Paul, and Rosetown, Minn., and (2) an application for authority to sell and deliver natural gas to Northern States at designated points for sale for ultimate public consumption either as straight natural gas or as mixed gas for domestic, commercial, industrial or other use in the same cities, and to sell natural gas to the applicant's affiliate, Peoples Natural Gas Co., for resale in St. Paul to the Ford Motor Co. and Waldorf Paper Products Co. for industrial use.

Fisher Governor Appoints Kansas Representative

Fisher Governor Co., Marshalltown, Iowa, has appointed The Sullivan-Mears Co. as its exclusive representative in Kansas and western Missouri. Sales and engineering service on Fisher automatic controllers is available at the new representative's offices in the BMA building, 215 Pershing Road, Kansas City, Mo.

H. W. Sullivan, for the past few years, has been employed by Briggs Clarifer Co. as zone manager in the Mid-Continent area. He has had previous experience in the oil and gas industries with Phillips Petroleum Co. and Bethlehem Steel Co.

Mears has had five years' association with the Fisher organization in the Kansas City territory.

Memphis Natural Application Denied by FPC

Taking note of diminishing natural gas reserves the Federal Power Commission last month dismissed without prejudice an application filed by **Memphis Natural Gas Co.**, which sought permission to construct and operate additional facilities in Arkansas and Mississippi. The company desired to construct three 18-in. natural gas lines aggregating approximately 61 miles and paralleling the unlooped portion of the company's existing line in Chicot County, Ark., and Bolivar, Coahoma and Tunice Counties, Miss. (See page 7.)